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THE PRACTICAL HOME & SCHOOL EDUCATOR

CONTAINING COURSES

OF

READING AND STUDY

WITH

Outlines and Questions

ARRANGED TO ACCOMPANY

The New Practical Reference Library

AN INVALUABLE AID TO THE STUDENT

CHICAGO

THE DIXON-HANSON COMPANY

1907

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A wise mother and good books enabled me to succeed in life. She was very poor, but never too poor to buy books for her children. It is a mean sort of economy that starves the mind to feed the body.—*Henry Clay.*

The Mother's Creed



BELIEVE, with the gardener, that the youngest plants should have the tenderest care; that the habits of early youth should be so moulded as to develop fixed traits of good character in the adult. I believe what one wills to be one can be; that education lays the foundation, but that self-education erects the building. That the mind can only possess that which it does. I believe that obstacles and reverses are but quality-testing stepping-stones to success; that the room for improvement is the largest room in the world. I believe that within the breast of every child is an instinctive desire to do good; to grow; to learn; to work; to love; to achieve. I believe in home encouragement; that a home without good, useful books is like a home without windows; that where there are children should be found the treasure thoughts of the greatest men and women of all ages which ever beckon on and on, inspiring to higher ideals and nobler ambitions. I believe that the mind can only be rightly formed when it is rightly informed; that opportunity ever knocks at the door of those who are rightly equipped to fight life's battles; that the power to think grows by exercise. I believe in the pleasure of self-sacrifice, the price paid by hundreds of mothers of world-renowned men. I believe in the education that stimulates thought; develops self-reliance and leads to a delight in whatever is fair in nature, in whatever is true and beautiful in literature and art.

Let us cherish our public schools as the looms, and our teachers as the weavers who weave the wondrous destiny for the nations.—*John Fiske.*

The Teacher's Creed

“ BELIEVE in boys and girls, the men and women of a great to-morrow; that whatsoever the boy soweth the man shall reap. I believe in the curse of ignorance; in the efficacy of schools; in the dignity of teaching; and in the joy of serving others. I believe in wisdom as revealed in human lives as well as in the pages of the printed book, in lessons taught, not so much by precept as by example; in ability to work with the hands as well as to think with the head; in everything that makes life large and lovely. I believe in beauty in the schoolroom, in the home, in daily life and out of doors. I believe in laughter; in love; in faith; in all ideals and distant hopes that lure us on. I believe that every hour of every day we receive a just reward for all we are and all we do. I believe in the present and its opportunities; in the future and its promises; and in the divine joy of living.”

Edwin Grover.

THE WORK OF THE TEACHER.

To help the young soul; to add energy, inspire hope, and blow the coals into a useful flame; to redeem defeat by a new thought, by firm action; that is not easy, that is the work of divine men.

Emerson.

Books are yours,
Within those silent chambers treasure lies
Preserved from age to age ; more precious far
Than that accumulated store of gold
And orient gems which, for a day of need,
The sultan hides deep in ancestral tombs.
These hoards of truth you can unlock at will.

—*Wordsworth.*

Habit is a cable of which we weave a strand each day, and bye and bye it becomes so strong nothing can break it. —Mann.

THE PRACTICAL HOME AND SCHOOL EDUCATOR

ITS OBJECT AND USE

A noted educator has said that a student is half made as soon as he seeks knowledge for its own sake. THE PRACTICAL HOME AND SCHOOL EDUCATOR aims to create such a desire and should become indispensable to every owner or user of THE NEW PRACTICAL REFERENCE LIBRARY. The chief claim to value of the EDUCATOR will lie in its ability to arouse the interest, systematize study, stimulate a love for knowledge-seeking, develop the observation, broaden the intellect, and add to the storehouse of useful and necessary information, on the part of every student, young or old.

THE OUTLINES

To the teacher and pupil the many excellent outlines, with the thousands of interesting, practical questions, should appeal very forcefully. They indicate clearly how a subject or topic should be discussed and studied. Teachers and pupils daily feel the need of outlining their work systematically and clearly to obtain the most effective results. Whether it be in the preparation of the simplest composition on a nature study subject, or the writing of an essay or theme, the pupil should have his outline to follow. The outline bears the same relation to a teacher's or pupil's work as the framework does to the building, the steel girders to a skyscraper.

In every city a course of study has been arranged for the various grades and departments of work and is followed by the teaching staff. In the preparation of the EDUCATOR the editors have made frequent reference to, and use of, these reliable guides, and it is believed it will be found in thorough sympathy and accord with the needs of teachers and pupils. The EDUCATOR contains model outlines on practically every department of knowledge, from the primary grades throughout the high school and normal course. These alone furnish the ambitious teacher ample suggestive material for the pursuit of any line of study during idle hours or permit successful review work. From these outlines the teacher will find it an easy and pleasant task to outline other subjects and follow them with interesting and instructive questions, *questions that entertain while they instruct.*

It will be noticed that all the main divisions of an outline will be found treated in THE NEW PRACTICAL REFERENCE LIBRARY. In the outline on AGRICULTURE, for instance, there are many subdivisions, such as SOIL, PLANTS, etc., each of which is fully and interestingly treated and in turn can be outlined.

Besides, the reader is constantly referred to lists of correlated subjects, permitting extended study and research.

THE QUESTIONS

The feature that will appeal to parents and teachers alike is the list of interesting questions that follows the outlines. These afford the student, young or old, a wide field for pleasant and profitable study. It must be apparent to every parent and teacher that by the use of this feature in connection with THE NEW PRACTICAL REFERENCE LIBRARY many an otherwise long, rainy day or winter evening can be devoted to excellent use. Home study clubs can be organized. Father and mother will find an hour spent with the children in such study invaluable to themselves. The habit acquired of devoting a few minutes each day in this manner must recommend itself to all who value time and know what it means to be well-informed.

It will be noticed that many of the questions relate to the boy's immediate surroundings—the home, the playground, the neighborhood, his city and county. This leads to a keener observation, greater alertness, and increases the interest. For home study work begin with subjects relating to the breakfast table, such as COFFEE, SUGAR, SALT, ORANGE, TEA, etc., and note the immediate interest aroused and what an earnest effort is made to procure the information called for. Many of the questions will arouse one's curiosity; curiosity will in turn arouse one's interest, and interest leads to investigation and study. These habits in turn lead to the acquirement of the most practical education.

In looking up the information sought from these questions in THE NEW PRACTICAL REFERENCE LIBRARY, the student should turn to the subject most directly alluded to in the question. Ninety-nine per cent of the questions are based on information found in the LIBRARY. Their value lies in the fact that they must be looked up. This soon develops the habit of research which leads to a love for knowledge. Once acquired this habit becomes a fixture for life. A few questions are asked throughout the EDUCATOR that cause one to resort to pencil and paper for solution, such as, "How many Rhode Islands can be carved from Texas?" "What would be the population of California if as thickly settled as Massachusetts?" In each case the information needed as a basis for solution will be found in the subject referred to and should be looked up. The comparison so made makes a vivid and lasting impression and will lead to further study and research.*

It is sincerely hoped the teacher, the parent, and the pupil will find THE PRACTICAL HOME AND SCHOOL EDUCATOR a source of daily encouragement, interest and value.

* Explanatory.—It should be remembered the outlines and questions are largely intended to serve as examples. The student should find it exceedingly helpful to prepare in some such manner hundreds of other subjects.—Editor.

The mind that is not awake and alive will find a library a barren wilderness.

—Theodore Parker.

The best part of every man's education
is that which he gives to himself.

—*Scott.*

To the Ambitious Young Man and Woman

The ambitious young man and woman denied the advantages of a broad education or desirous of adding to their fund of useful information will find THE NEW PRACTICAL REFERENCE LIBRARY and THE PRACTICAL HOME AND SCHOOL EDUCATOR a veritable university placed at their disposal. With the helpful stimulus and effective, intelligent plan of study furnished by the EDUCATOR a field for study is opened, as wide as human knowledge and achievement. The best thoughts of all the ages, the wisdom gathered from a thousand geniuses are placed at their disposal. An hour a day of such study will make an ignorant man well educated in the course of two years. It gives him a capital on which he will draw dividends and interest throughout life. Today, more than ever before, it is the man who knows, the one who is broadly and correctly informed, who is ready to grasp the opportunities as they come. Self-help is at the basis of all achievement.

"Education," Bishop Spaulding says, "lays the foundation; self-education erects the building." Not to grow is to retrograde. No one is so great in business or skilled in the arts that he can afford not to improve himself. It is said that the late Marshall Field made it a rule to keep no employee who did not merit promotion within six months after beginning work. The greatest students, and not the men of greatest talent, dominate the world's affairs. Life is a battle. The victors are those who not only advance to meet every opportunity, but daily add a fresh fund of practical knowledge, knowing that knowledge is not only power, but property.

That accomplished philologist, the late Lord Strangford, could find ample amusement for an hour's delay at a railway station in tracing out the etymology of the names in Bradshaw.

Let me advise you to make a variety in your modes of teaching. If you have been teaching in one way that you think is best, take another way tomorrow. The new way will be a revelation to some of your dull pupils with whom you have been unable to do anything.

—Francis W. Parker.

To the Teacher

A school without interest is a burying place for many ambitions. Here are killed the impulses to grow, to know, to study and observe, to do and to acquire. The caretaker of such a school is a teacher who has ceased to grow and so can only weary where she should inspire and stimulate. Such a teacher, either from lack of material or inclination, invariably follows a narrow, beaten pathway, the walls of which are lined with the lifeless pages of text-books. True teachers must feel that they are educating themselves as well as their pupils. They must enter into the work with enthusiasm and earnestness. They should kindle in the heart of every pupil a love for study. They should endeavor to add to every well-known fact some new material. In stimulating their pupils to think, to investigate and to observe, they should themselves be searchers and observers. Such a teacher gradually leads the pupil to educate himself, by developing the powers of his mind through his interest, and so renders her aid unnecessary.

To such teachers, *THE PRACTICAL HOME AND SCHOOL EDUCATOR* and *THE NEW PRACTICAL REFERENCE LIBRARY* cannot fail to appeal. In these volumes, which are a product of the leading educators of the country, the teacher will find helpful supplementary material, timely suggestions, and an inexhaustible field for self-improvement. The splendid outlines and excellent questions will prove invaluable as a stimulus for the pupil's study. Lessons are made bright and interesting by new material. Subjects are assigned to be looked up, and each teems with life and interest. Contrast this for a moment with the old method, which was dependent upon memory and rote work. Schaeffer, in his "Thinking and Learning to Think," says: "From the day the children became interested in their lessons, the rod was no longer required. Instead of crying because they must go to school, they now cry because they cannot go."

The thousands of questions covering all grades of school work can be used by progressive teachers to awaken the liveliest interest on the part of both pupil and parent. When the educational sense is aroused, it is not difficult to get good results. Then discipline comes as a matter of course. Where interest is lacking, success is lacking. You cannot fill a corked jug by pouring water on it. You cannot teach when the mind is still asleep. Promotion always follows preparation. Teachers do not progress because of luck or pull, but generally because of good results caused by ceaseless effort. Cream always rises to the top.

We sincerely believe that by the use of *THE PRACTICAL HOME AND SCHOOL EDUCATOR* and *THE NEW PRACTICAL REFERENCE LIBRARY* teachers will be able to better systematize their work, save their energy, economize their time, and make every lesson more interesting, every day's work more effective.

It is easier for the growing boy to form a hundred good habits than to reform one bad one as an adult.

To Parents

You often have wondered why some boys take such a delight in their school work, while others are almost forced to attend.

Let us visit the homes of two such boys of the same age in quest for a reason. In the first home we find a boy with an active and inquisitive mind. He asks scores of questions, the natural food stimulus to a growing mind, some the result of his day's school work, some prompted by his father's and mother's discussions or reading, others the result of his day's observations in the home or on his way to and from school, still others the result of his own thinking and discussions with his playfellows. We admire his interest and alertness. We say to ourselves that to begin right is to continue right. Instinctively we think of the successful professional and business men whom we know as having been just such boys, retaining all these years the habits and traits of early boyhood. Inquiry reveals the fact that this boy has been blessed with teachers who helped him most by leading him to help himself. They have stimulated him to think, to observe, to investigate subjects and questions; in short, to do for himself. We also learn what is far more important—that he has constantly been encouraged along these lines of study by an interested father and mother, who provided him with the means for self-help and improvement.

In the second home we find a boy who manifests no interest in his school work or studies. He does not observe; he does not ask questions; he is not wide-awake; he does not think or reason; he has a mind, but it is not hungry for knowledge; he prefers idleness to activity. Again we think of many idlers and no-accounts, of the shiftless and dependent, and picture we see them as in boyhood in the boy before us. Inquiry reveals the fact that his teachers have stimulated him to think, to observe, and do for himself, but he fails to respond because his first efforts along this line have met with no encouragement from father and mother, who felt their whole duty was done when he was sent off to school, forgetting that he needs their help, their encouragement, above all, their interest in his work. Again, father and mother cannot help him, because they do not understand his work or are too busy to give it their time. He finds no helpful working tools on his study table. The question that he was assigned to look up yesterday he cannot answer on his return to school today. He feels the odds are too great, the humiliation too much. He becomes discouraged, soon he loses heart and all interest, and simply drifts. The teacher's best efforts will fail unless the home influence is right.

In the case of each boy's early years, asking questions was perfectly natural. Asking questions should be a source of pleasure and satisfaction, a lack of them a source of regret and grave concern in every home where there are boys and girls.

THE PRACTICAL HOME AND SCHOOL EDUCATOR has been prepared to enable

parents and teachers of the first boy to hold and develop his interest; to enable the parents and teachers of the second boy to encourage and awaken and stimulate in him a desire to learn and achieve. It furnishes a field of natural research and delightful study, broader than that given in any college or university.

In the preparation of THE NEW PRACTICAL REFERENCE LIBRARY, the educators have aimed to give information in simple, concise, and interesting manner on practically every subject that will come up in connection with a boy's entire school life, and, best of all, to give it in such a way that he can find it by himself and for himself. Intelligent parents and teachers have long felt the need of such a work.

The thousands of questions and helpful outlines cannot fail to interest every one. A studied effort has been made to ask such questions as will lead to observation and investigation in the boy's own home and immediate neighborhood. Parents using the EDUCATOR in connection with THE NEW PRACTICAL REFERENCE LIBRARY will find much of help and interest to themselves. We never grow too old to learn. No one is too old or too young, too wise or too ignorant, to gain good from its pages. After all, the habit, early acquired, of looking up subjects as they come to one's mind, is the most valuable part of any boy's or girl's education. With this habit securely fixed, school houses and teachers could be dispensed with and yet the education would go on and on as did Lincoln's.

Hawthorne in the parlor of a country inn on a rainy day could find mental nutriment in an old directory.

How to Study

The spirit of self-help is the root of all genuine growth in the individual. The opportunities for study which the quiet of the home offers are unequalled. The way the leisure hours at home have been used has determined the success or failure of legions of men and women. When one has learned *how* to study he has obtained the best part of his education; for he has acquired the power which will enable him to master any subject, provided he possesses the necessary patience and perseverance. The men who are considered great geniuses, and who have moved the world, have been able to accomplish great things because they were able to attend to subjects longer and more systematically than their fellows.

One's education consists of two parts—what one learns by oneself and what one learns from others. Both parts are valuable, but with most people the second is by far the more extensive. What we learn from others is obtained very largely through the reading and study of books.

Books contain the stored-up wisdom of the past. Through them we learn of the experiences—the successes and the failures—of previous generations, and profit by these experiences.

Study is systematic reading for the purpose of gaining knowledge. This fact should be kept in mind by parents and teachers.

The following directions for study are given in the hope that they may save some waste of effort and be found generally helpful:

1. Study requires attention. One cannot gain knowledge through reading unless his mind is fixed upon the subject. A boy cannot solve a problem in arithmetic while thinking about a game of marbles, nor can a girl learn a lesson in history while her mind is upon a party she expects to attend in the evening.

2. Interest is the key of attention. Why does the boy think of the game of marbles instead of the problem, and the girl give her attention to the coming party instead of the history? Simply because the marbles and the party are more interesting subjects. Were the arithmetic and the history made as attractive, the attention would be given to them as readily as to the marbles and the party. *Interest* is the satisfaction that we derive from the study of a subject or the appeal which the subject makes to us.

3. Understanding is necessary to interest. A subject which we do not understand does not appeal to us. All subjects should be so presented to children that they can understand them. The language should be simple and the thought and illustration should be clear. When parents and teachers present subjects to children in this way, they will have little trouble in securing interest in them. Care should be taken that the meaning of all words used be understood and that all references to related subjects be cleared up. This means that children should be taught as early as possible the use of works of reference.

4. Study to remember. Memory links the past with the present. It is that mental power that enables us to join the lesson of yesterday to that of today.

It develops early in life and should receive careful cultivation. But we should be sure that children understand what they memorize. Unless this precaution is taken, they will commit to memory words that have no meaning.

5. Study systematically. A systematic arrangement of a subject under divisions and subdivisions assists in the understanding of the subject and also aids the memory. Suppose you wish to learn about COAL. You would want to know (1) what it is, (2) how it is formed, (3) the different kinds or varieties of coal, (4) where it is found, (5) the leading countries in its production, (6) its principal uses, (7) how long it has been used, and when it was discovered in the United States. The above outline gives an idea of the sort of plan that should be followed in studying a subject, also how the leading articles in the NEW REFERENCE LIBRARY are arranged.

6. Study to apply your knowledge. The only test of knowledge is ability to use it. A boy may commit to memory all the rules in the arithmetic, but if he cannot reckon the interest on a note, he does not *know* the rule for finding interest, however glibly he may repeat it.

The great secret of reading consists in this: that it does not matter so much what we read or how we read it as what we think and how we think it. Reading is only the fuel; and, the mind once on fire, any and all material will feed the flame, provided only it have any combustible matter in it. And we cannot tell from what quarter the next material will come.

The true university of these days is a
collection of books.

—*Carlyle*.

Agriculture

Agriculture is the oldest of occupations and the basis of all other arts. All wealth comes originally from the soil and thus the farmer becomes the backbone of civilization.

The great demand for American agricultural products by the nations of Europe has led to wonderful development in every department, and to the intelligent farmer who knows how to produce the best results without exhaustive labor, farm life is the healthiest and most invigorating in the world.

THE NEW PRACTICAL REFERENCE LIBRARY is rich in information along every line of agricultural development. The general outline, followed by the outlines and questions on IRRIGATION, CORN, MILK, FORESTRY, etc., are merely suggestive of the treatment of the hundreds of undeveloped subjects.

OUTLINE.

- I. EARLY HISTORY.
- II. PROGRESS.
- III. AGRICULTURAL MACHINERY.
- IV. DIVISION OF LABOR.
 - 1. Dairying.
 - 2. Stock Raising.
 - 3. Horticulture.
 - 4. Cereal Crops.
- V. EDUCATION.
 - 1. Agricultural College.
 - a. Who first recommended?
 - b. When first established?
 - c. What grants and appropriations?
 - d. How universal now?
 - e. What kindred subjects?
 - f. How locally adapted?
 - 2. Agricultural Experiment Stations.
 - a. Origin.
 - b. Location.

c. Number.

d. Work.

Experiment with fertilizers.

Experiment with soils.

Improve varieties of grain.

Improve varieties of fruit.

Improve breeds of live stock.

To study habits of noxious insects and devise means of destroying them.

To study diseases of domestic animals, and to provide means for their prevention and cure.

e. Specialize.

f. Bulletins.

g. Results.

3. Department of Agriculture.

a. 1862 Organized.

b. 1889 Made an Executive Department.

c. Bureaus.

Weather Bureau.

Bureau of Plant Productions.

Bureau of Soils.

Bureau of Forestry.

Bureau of Chemistry.

d. Lines of Investigation.

Improvement in plant production.

Study of soils.

Study of rotation of crops.

Improvement of live stock.

Issue of bulletins.

VI. SOIL.

1. Agencies in Formation.

a. Atmosphere.

b. Sunlight.

c. Water.

d. Plants.

e. Animals.

2. Composition.

3. Kinds.

a. Alluvium.

b. Sandy.

c. Clayey.

d. Lime.

e. Peaty.

f. Loam-humus.

4. Fertilizers.

a. Natural.

Manures.

b. Commercial.

Fertilizer.

Guano.

Menhaden.

VII. PLANTS.—Seeds.

1. Development.

2. Roots.

a. Function.

3. Stems.

a. Function.

4. Leaves.

a. Function.

5. Fruit.

6. Germination.

7. Fertilization—pollen.

8. Uses.

a. Purify air.

b. Loosen earth.

c. Fertilize soil.

d. Serves as food.

9. Enemies and Diseases.

a. Fungi.

b. Smut.

VIII. CORRELATED SUBJECTS:

Agrarian Law.	Dairy.	Insects.
Agriculture.	Distillation.	Insurance.
Agricultural Colleges.	Dog.	Jute.
Agricultural Experiment Stations.	Education.	Land.
Animals.	Emigration.	Lease.
Ant.	Ensilage.	Law.
Atmosphere.	Farmers' Institutes.	Maize.
Banking.	Fish Culture.	Mensuration.
Barometer.	Flax.	Oats.
Bean.	Floriculture.	Oils.
Bee.	Flour.	Manure.
Beet-Sugar.	Forests.	Parasites.
Birds.	Fruit.	Potatoes.
Botany.	Fungicides.	Poultry.
Bread.	Grasses.	Pumpkins.
Breeds.	Granges.	Rent.
Building.	Guano.	Salts.
Butter.	Grasshopper.	Sequoia.
Cattle.	Horticulture.	Sewage.
Climate.	Harvesting.	Sheep.
Cheese.	Heating.	Sugar.
Clover.	Honey.	Swine.
Coal.	Hops.	Threshing Machinery.
Commerce.	Horse.	Tobacco.
	Hunting.	

QUESTIONS ON AGRICULTURE.

How many things can you name on your table dependent on the farmer—remembering that milk, cream, meats of all kinds, flour, and all vegetables are his products?

If your field of wheat is attacked by rust or chinch bugs what crop should follow to destroy the pest?

To what extent is Roosevelt interested in farmers?

Why are farmers considered the backbone of a nation?

Give a number of inventions in farm machinery and results of their use.

Does agriculture now rank as a science?

Where will the influence of scientific farming be felt first, on the small or the large farm? Why?

Are individual farms becoming smaller? Why?

Can scientific methods on small farms balance the loss in acres, do you think?

What is the average size of English farms? Of farms in the United States?

What is the demand abroad for our agricultural products?

What are the chief agricultural products of Europe?

Name our agricultural exports and imports.

Why did the government become interested along this line?

What are they doing along the line of reclaiming arid districts in the United States by irrigation?

What are experiment stations? What are the direct benefits to the farmer?

Who were the foremost people in agriculture in ancient times? Tell of their methods and knowledge.

Growing crops are subject to what dangers in general?
 What particular blight threatens each of the following: Cotton? Oats?
 Corn? Wheat? Hay?
 What is the government doing along this line?
 At what date did the United States government take up the subject of agriculture?
 What do we mean by the term "specializing" in farming?
 What are the benefits of specializing in farm work?
 Are most of the farmers what we may term "general farmers"?
 Why is progress along scientific lines in farming of slow growth?
 What is the value of the rotation of crops? Give some of the beneficial results obtained?
 Of what interest and value are farmers' institutes?
 What are the chief ingredients of fertilizers brought from the slaughtering houses?
 What references are made to the grain and corn products of Egypt in the Old Testament?
 Agriculture is the basis of all other arts. Why?
 In a bushel of oats weighing forty pounds how many pounds would constitute the meal?
 What is winter wheat? Spring wheat? What is the annual production in this country?
 Were potatoes known in Europe before the discovery of America?
 What is the chief importance and value of beets?
 Name some of the materials found in your home dependent on flax. How does flax enter into the painting of your home?
 Where is tea successfully raised in the United States? Rice?
 Where is tobacco raised? What is the height of the plant? What part of it is used?
 What remarkable improvement in the tobacco plant has Burbank brought about?
 If you should visit the farmers of Oregon, what crops would you find in their fields?
 What would you find to be the principal crop on the Kansas farm? On the one in Michigan? In Pennsylvania? In Kentucky? In Virginia? In Manitoba?
 Of what great value to the agriculturist and horticulturist are some of Burbank's wonderful discoveries and experiments?
 How many sheep are slaughtered in the United States yearly?

Irrigation

I. DEFINITION AND PURPOSES.

II. ANCIENT.

1. Egypt—China—India.
2. United States—Mexico.
 - a. Indians.
 - b. Spanish missionaries.
 - c. Miners turned attention to agriculture.
 - d. Mormons.

III. MODERN.

1. Egypt.

a. Dams across the Nile increased irrigable area how many million acres?

2. United States.

a. What acreage reclaimed in west and southwest?

3. Other sections of world.

IV. NECESSITIES OF IRRIGATION.

1. When annual rainfall is less than what amount?

2. When rainfall is distributed how?

3. For crops requiring what?

V. METHODS AND AIMS.

1. Preserving rainfall where?

2. Saving of waste water, where and how?

3. Distribution of water to what districts?

VI. STATISTICS.

1. Size of farms.

2. Amount of water used.

3. Engineering feats.

a. Tunnels.

b. Reservoirs, etc.

VII. GOVERNMENT AID.

1. Reclamation Law.

2. Work accomplished.

3. Work projected.

QUESTIONS.

What is irrigation?

Why is it necessary for government to carry on this work?

What important law has been passed relating to irrigation and what are its provisions?

What are some of the feats in engineering necessary in this work?

What parts of the United States are being reclaimed?

Locate some of the largest reservoirs and dams in United States.

In what foreign countries did irrigation originate?

How long are the dams across the Nile? For what are these dams used?

Who first practiced irrigation in the United States?

What is the outcome of irrigation in the Mormon settlements in Utah?

When is irrigation necessary?

What are the three lines of work in this industry?

What is the average size of an irrigated farm in the United States? In Utah? In California?

INTERESTING FACT ON IRRIGATION.

According to official figures, since the reclamation law was enacted by congress in 1902, eight towns have been built and 10,000 people have settled on what were desert lands. One hundred miles of branch railways have been built, 1,267 miles of canals have been dug, many of which carry whole rivers, and forty-seven tunnels have been excavated. It is estimated that the territory embraced in what is known as the arid regions of the United States covers 600,000,000 acres, of which about 60,000,000 acres are subject to irrigation and can be converted into farms fully as productive as lands in the most favored sections.

Refer to illustration on irrigation and tell of some of the results you see.
 What is the income per acre of irrigated land?
 What is the value of irrigated land?
 What is the Reclamation Law? Where was it passed?
 How many acres are included in the Reclamation Law?
 For how many families will this provide homes?
 What will be the expense of the government to irrigate this land?
 From what great distances is water sometimes brought?
 In what localities is irrigation dependent upon artesian wells? What are the methods?
 What are flumes?
 How fast has the irrigation of arid regions of the United States increased in the last ten years?

Corn

I. GENERAL DESCRIPTION.

1. Stalk.
 - a. Height.
 - b. Jointed.
 - c. Color.
 - d. Structure.
2. Leaves.
 - a. Shape.
 - b. Length.
 - c. Position.
3. Fruit—Ears.
 - a. Arrangement of kernels, and number on cob.
 - b. Covering. What?
 - c. Location on stalk.
4. Flowers.
 - a. Location on stalk, where?
 - b. Location on ear, where?
 - c. Silk.
 - d. Tassel.

II. HISTORY.

1. Corn was first used and cultivated where and by whom?
2. Use by whites dates from what time?
3. Cultivation by other nations.

III. KINDS.

1. Flint.
 - a. Inferior grade. Cultivated where?
2. Dent.
 - a. The corn of commerce.
3. Sweet Corn. Canning industry.
4. Pop Corn. Commercial uses.

IV. PLANTING, CULTIVATION, HARVEST.

1. Planted how? Machinery used?
2. Cultivated or plowed, how long? Machinery used?
3. Harvested. When? Where placed?
4. Fodder. What is it? How cut? How used?

V. WHERE CULTIVATED.

1. United States.

- a. What per cent of world's supply?
- b. Annual yield in bushels?
- c. Valued at what?
- d. Importance as an industry?
- e. Income exceeding what two crops combined?

2. Foreign Countries.

- a. Russia.
- b. Canada.
- c. Argentina.
- d. Austria, etc.

VI. PRODUCTS.

1. Food. Importance in world as food.

a. Mankind.

- Meal.
- Hominy.
- Hull corn.

b. Animals.

Whole corn and preparations for all live stock.

2. Miscellaneous.

- a. Starch.
- b. Glucose.
- c. Alcoholic liquors.

3. Cobs.

- a. Syrup.
- b. Fuel.

4. Husks.

VII. MARKETS.

1. Local.

2. World.

3. Board of Trade.

QUESTIONS.

Why called Indian corn?

How many dishes are made from corn meal in your home?

Start with the farmer and name the industries that arise or are dependent upon corn.

To what family of plants does corn belong?

How does corn rank as a food throughout the world?

AN INTERESTING CORN FACT.

Prof. Wiley of the Department of Agriculture says that inasmuch as every hundred pounds of cornstalks will yield six and a half pounds of absolute alcohol, it is obvious that the agriculturist has been allowing an enormous amount of wealth to go to waste.

Say that one acre will yield from ten to twelve tons of grain stalks, or about 20,000 pounds, and you have a quantity of raw material which will produce 1,300 pounds of absolute alcohol, or 216 gallons. Alcohol at the present time is worth 40 cents a gallon.

Ground in a wet condition and dried, cornstalks may be kept indefinitely and are ready at any time for conversion into alcohol. Prof. Wiley says that the alcohol derivable from the cornstalks that now go to waste in this country would not only drive all the machinery of our factories but would furnish the requisite power for all our railroads and steamboats, run all of our automobiles, heat and illuminate all our houses and light the streets of every city in the union.

What does corn contain that makes it valuable as a food?
 In general appearance what plant does it resemble?
 How many kinds of flowers has the plant? Which flower forms the tassel?
 Which the silk? What is at the end of each thread of silk?
 Do the ears have an odd or even number of rows? How are they covered?
 Why?
 Of what continent is corn a native? What is known of its use among the
 Aztecs and Incas? How far north is corn now cultivated?
 What is the difference between the corn belt in the cool temperate regions
 and that of the warmer corn belt?
 How does corn compare in value with wheat?
 What is the average price of corn per bushel? What is the average yield
 per acre? What is the value of a crop on 40 acres of land yielding 65 bushels
 per acre?
 What are the results of a failure in the corn crops of the United States?
 Follow the corn from the field until it is returned to you as corn meal. As
 cornstarch. As sugar.
 Describe flint corn. What are the two chief varieties of flint corn? Where
 is the yellow variety generally raised? Where is the dent corn grown? From
 what does it take its name? How high does it grow?
 To what extent does the United States export corn? To what countries?
 Follow its line of travel from the village warehouse to its destination.
 How does sweet corn differ from field corn? What great industry is con-
 nected with this article?
 Why is corn used as a fattener of stock?
 In what manner did the Indians grind corn? How is it cultivated and pre-
 pared for food by the native Mexican today?
 How is corn planted? Cultivated? Harvested? When does the cultivation
 begin? Upon what do the methods of harvesting depend? What machines are
 now in use on the larger corn farms?
 What proportion of people use it as a food? Give three forms in which it
 is commonly used.
 Give three manufactured products made from it which are used extensively.
 From what is corn oil made? For what is it used?
 Of what value are the stalks? How is green corn used as fodder? De-
 scribe the process in detail. (See ensilage.)
 What proportion of the world's product is raised in the United States?
 Name the three leading corn-producing states.
 How many billion bushels are raised annually in the United States? What
 is the value of the yearly crop?
 How does this compare with the production of gold? Silver? Iron? Cot-
 ton?
 What foreign countries produce large quantities of corn?

Milk

- I. DESCRIPTION.—Liquid, odorless, sweet, opaque, etc.
- II. SOURCES.
 1. Cow.
 2. Goats.
- III. COMPOSITION.
 1. Solids.
 2. In Solution.

- a. Water.
- b. Caseine.
- c. Sugar.
- d. Fat.
- e. Salt

IV. USES.

- 1. Primary.
 - a. To support offspring of mammals after birth.
- 2. Secondary.
 - a. Food. Beverage, cooking, etc.

V. PRODUCTS.

- 1. Cream.
- 2. Butter.
- 3. Cheese.

VI. DAIRIES.

- 1. Breeds of Cattle. Alderneys, Shorthorns, Jerseys, etc.
- 2. Separators, Butter-Making, etc.

VII. CREAMERIES.

- 1. Owners.
 - a. Association of farmers.
 - b. Stock company.
 - c. Individuals.
- 2. Apparatus.
 - a. Milk and cream testers.
 - b. Milk tanks. Fresh and skim milk.
 - c. Cream tanks.
 - d. Engine.

VIII. DISTRIBUTION OF MILK.

- 1. Milk trains.
- 2. Milk wagons.

IX. PRODUCTS AND EXPORTS OF FACTORIES.

- 1. Butter.
- 2. Cheese.
- 3. Oleomargarine.
- 4. Butterine.
- 5. Condensed milk or cream.

X. GOVERNMENT INSPECTION.

- 1. Adulteration.
 - a. Water.
 - b. Chalk, etc.

QUESTIONS.

If you could have but one food throughout life, which would you take—milk or meat?

What work is performed by the separator?

What is a creamery? Generally located where?

A MILK-TREE.

There are several species of the milk-tree in South America. That of Brazil is one of the largest trees of the kind. It furnishes a wood much prized for shipbuilding. The tree is tall, with large oval leaves and dark brown bark. It yields a fruit that tastes like that of strawberries and cream. A white milk flows when an incision is made in its trunk. This milk, like that which comes from a cow, can be used in tea and coffee. It will burn easily and gives out a green flame. It belongs to the family of fig-trees. —Morton.

What causes milk to sour? Give uses of sour milk. What is whey?
Name the different kinds of cheese. What foreign country is noted for its cheese?

How is milk regarded as a diet? Why should it be drunk slowly?

What makes cream rise to the top?

Why is cheese served with the last course at dinner?

In what ways can milk be adulterated?

Why does headache often follow the drinking of milk?

How is it possible for milk to be the means of spreading disease?

What steps has the government taken in regard to milk inspection?

Name some of the dishes prepared in cooking whose foundation is milk or cream.

Is milk an absorbent? What dangers lie in this fact? What are some of the rules for the taking care of milk?

Correlated subjects: Butter, Cheese.

forestry

I. DEFINITION.

II. PURPOSES.

1. National government.

- a. Creation and maintenance of forest reserves.
- b. Prevention of forest fires.
- c. Reformation of present methods of lumbering.
- d. Reforesting of denuded areas.
- e. Coöperation with states to preserve forests within their boundaries.

2. State government.

- a. Arbor Day—Origin and how observed—Aims, etc.
- b. Coöperation with National government.

III. METHODS.

1. Schools established by government in which experts are trained to devote their life to the work of forestry.
2. Experts sent from these schools to lecture, etc.

IV. USES OF TREES.

1. Shade and ornament.
2. Windbreaks of farms.

NOTE (told by an Indian guide).—It was a pine tree growing in a gulch in Colorado, 8 feet in diameter and over 100 feet high. I had promised to return when this tree was felled and look the giant over. It fell with a crash on one of its huge limbs, splintering it so badly that it was useless as timber.

On making a study of it I found the tree to be 1,047 years old, a ring for every year's growth; quite a tree in the year 1340, over a hundred years before America's discovery.

For the first hundred years of its life it had had a prosperous growth, as rings were fully and largely developed. Then followed two years of poor, thin growth, as indicated by the rings succeeding the thick, regular ones. In the year 1491 a peculiar accident occurred; a tree growing near apparently toppled over upon it, two tips breaking off and being imbedded in that year's growth. In the year 1560 Indian arrowheads were found. In 1700 bullets had penetrated its sides. In 1807 results of an earthquake appeared. Dr. Woodpecker had also performed an operation, and, by the way, he does untold good in removing all traces of weevils, injurious insects, etc.

Time does not permit of giving further results of studying the cross section of this tree, its roots, branches, etc., but one familiar with this work cannot fail to be impressed with a feeling of sadness as he gazes upon the fallen giant, which has stood for centuries looking down upon the rise and fall of nations.

3. Prevent floods.
4. Hold moisture.
5. Hold sandy, shifting soil.
6. Leaves.
 - a. Enriches soil.
 - b. Protects soil.
 - c. Coal, etc.
7. Homes for animals and birds.
8. Commercial value—See Lumber Outline.
9. Shelter and food.

V. PRODUCTS.

1. Food—fruit, nuts, syrup, etc.
2. Miscellaneous—medicine, tar, turpentine, resin, rubber, tannic acid, lumber, camphor, etc.

QUESTIONS ON FORESTRY.

- From what species of trees is the furniture in your home made?
 Name five fruit trees common to your orchard.
 What varieties of trees are found in your neighborhood?
 Of what uses are the fallen leaves? Those on the trees?
 From where does our maple syrup come?
 How do trees breathe? What is the circulation of a tree?
 What uses are made of the barks of different trees?
 Give a list of trees from which food is obtained used in your home?
 Where are the immense forests of the world?
 What does the traveler's tree furnish, from which originated its name?
 From what trees are the following obtained—dyes, tar, turpentine, quinine, camphor, rubber?
 What causes forest fires? What means have been adopted to prevent them?
 Is Arbor Day observed at your school? In what states is it observed? What are the lasting effects of this observance?
 Give height and size of some of the largest trees of which you have read?
 What do we mean by hard wood trees? Soft wood? Name some of each.
 What is the bottle tree? Why so called? Where grown?
 Where is ebony procured? For what is it greatly valued? What are its prevailing colors?
 What remarkable size is attained by the redwood trees of California and Oregon?
 Where is the bread fruit tree grown? Why so named?
 Where does the rubber tree grow? Describe the process of rubber making.
 What species of trees would you expect to see were you to travel in the Hudson Bay country of Canada? In Alaska? In Brazil? In the Philippine Islands?

BUTTER FROM TREES.

The fruit of the butter-tree of India yields a fixed oil which has the appearance of butter, and which may be used for all the purposes that cow's butter is used.

A NATURAL STREET-LAMP.

The traveler in the forests of India is often startled by the appearance of what seems to be an electric street-lamp. A nearer approach reveals the fact that the "lamp" is a bird's nest plastered all over with enormous fireflies, which are alive and attached to the nest by bits of moist clay. The baya bird that owns the nest does not like darkness, and has thus devised this plan of utilizing the lamps of the glow-worms.

—Morton.

Lumber

- I. KINDS.
 1. Hardwood—mahogany, rosewood, ebony, etc.
 2. Soft woods—pine, cedar, etc.
- II. SAW MILLS.
 1. Location.
 - a. Lumber camps.
 - b. Seaports, inland cities.
 2. Methods of sawing and handling trees.
 - a. Large timber—Machinery.
 - b. Small timber—Oxen, etc.
 - c. Transporting to mill.
 3. Product.
 - a. Rough lumber—logs, poles, planks, railroad ties, etc.
 - b. Finished lumber—veneers, flooring, siding, interior finishings.
 - c. Finished articles—furniture, implements, etc.
- III. TRANSPORTATION OF LOGS TO DISTANT SAW MILLS.
 1. Methods.
 - a. Rafting.
 - b. Shipping by rail or water.
- IV. DRYING.
 1. Kilns.
 2. Sun dried.
- V. PURPOSES.
 1. Buildings—public and private.
 2. Railways—all equipment of wood, etc.
 3. Ship building and yards, etc.
 4. Furniture, etc.
- VI. LUMBER PRODUCING COUNTRIES.
 1. United States—Wisconsin, Michigan, Minnesota, Washington, Maine, etc.
 2. Foreign—South America, Sweden, Russia, Germany, France, Mexico, Canada, Africa.
- VII. COMMERCIAL.
 1. Fourth industry in United States.
 2. Leading industry in foreign countries.
 3. Lumber markets of world.

TEST QUESTIONS.

From what countries do our hard woods come?

What do we mean by veneers? Are they largely used? Where?

What cities in the United States are noted for their manufacture of furniture?

What determines the cost of different woods?

Why are mahogany and rosewood expensive?

In the construction of a frame house, what are the parts or pieces of lumber used and from what regions does the wood come?

Into what sizes are boards cut?

What are the names of the different pines used for lumber? Why is this wood largely used in construction work?

I finish my parlors in mahogany: trace from tree to room with the help of

the following, expanding same all along the line: Tree located on a large ranch in Mexico, fifty miles inland, up river. Cut down by native Mexicans or peons. Hauled to narrow gauge railway by oxen and with many others hauled to mill on ranch. Cut into large logs. Rafted down river with others to port, loaded on vessel. Shipped to Mobile. Cut into different sizes of boards, veneers, etc. (Explain processes.) Dried. Shipped to Chicago yards. Sold to contractor building the house. Give full details of work, etc., by referring to THE NEW PRACTICAL REFERENCE LIBRARY, and with the help of the following questions:

In what time of year is the cutting of timber carried on? Why?

Where do the lumbermen live during this work?

How do they fell the trees?

How are the logs transported to the saw mills?

How is a log raft made? How is it towed to the mill?

How is lumber manufactured?

Where are the important lumber regions in the United States?

What machinery is necessary in a saw mill?

From what are laths made? Shingles?

How are the big trees in California handled?

How does lumbering rank as an industry in the United States?

What is the value of the lumber produced yearly?

How many men are employed in this industry?

What skilful economy is practiced in the running of a saw mill?

Money will enable you to buy a fine copy of Shakespeare, but it cannot purchase for you the ability to appreciate a play of Shakespeare—that is the result of education. Wealth will enable you to cover the walls of your costly mansion with beautiful pictures; and the sewing girl, if she has been properly taught in the public school, will get more enjoyment out of them than can possibly be gotten by the sons and daughters of wealth and luxury whose education has been neglected.

—Schaeffer.

What a piece of work is man! How noble in reason!
How infinite in faculties! In apprehension, how like a God! —*Bacon.*

Anthropology

The science of man as a study is of primary importance to the race. Taken in its broadest scope, it includes all the sciences in their relation to the history of human life.

These various subjects are outlined in this Educator under the topics of PSYCHOLOGY, PHYSIOLOGY, LITERATURE, etc., and found fully treated in THE NEW PRACTICAL REFERENCE LIBRARY.

As a direct study we present herewith an outline showing the various branches of the human race as developed from the treatment of the INDO-EUROPEAN, SEMITIC, and HAMITIC races, together with the many correlated subjects, as PHILOLOGY, SANSKRIT, etc., which are treated so interestingly in THE NEW PRACTICAL REFERENCE LIBRARY.

We also submit you outlines on the American INDIAN and CLIFF DWELLER, with suggestive questions. The successful student should not only develop simple outlines in connection with the study of the various races and types of people, but also in connection with the language, dress, sustenance, shelter, tools, weapons, their religious beliefs, family relations, customs, legends and superstitions, and the hundreds of sub-topics which will be found treated so interestingly therein. The observing student will find much of interest and value in a study of the splendid colored illustrations of the various races found throughout the LIBRARY.

TEST QUESTIONS ON ANTHROPOLOGY.

Name the races of man. What seems to have been the basis of this classification? Name the races found in your own city or county.

Why was the Caucasian race thus named? What territory is controlled by them?

Which are the more progressive, the Chinese or Japanese? What territory is inhabited by the yellow race?

What are the chief characteristics of the Malay or brown race?

Has a negro tribe ever been known to develop a civilization without help of other races?

Does Darwin account for origin of species? What is the Darwinian theory?

What are a few of the theories concerning the origin of man?

What are the characteristics that distinguish man from all other animals?

Is man the only animal with a moral sense of right and wrong?

Distinguish between the terms intellect and instinct.

Give reasons for the decline of the Indian. What white people have intermarried with them?

How do the Mexican and Central American Indians compare with those of the north and the extreme south?

When did the negro question in the United States become a national one?

Along what lines does Booker T. Washington advocate the education of the negro?

Is man a social animal? Give reasons for your opinion.

Give a few of the methods by which primitive man communicated with his fellow. Name methods of the present time.

Describe efforts of primitive man in his struggle for food, shelter, dress. Was dress originally only ornamental?

What were the weapons and tools of primitive man? Did he regard all men as brothers? To what bounds was his sense of right and justice limited?

How were sports and pastimes regarded by early peoples?

The Eskimos are supposed to be akin to what race? What does the word mean? How do they compare with the Indians in progress? Why were the Cliff Dwellers so named?

Branches of the Human Race

I. ARYAN OR INDO-EUROPEAN BRANCH.

1. Sanscrit.
2. Persian.
3. Armenian.
4. Greek.
5. Latin—Italic or Romance Nations.
 - a. French.
 - b. Spanish.
 - c. Italian.
 - d. Portuguese.
6. Germanic or Teutonic Nations.
 - a. English.
 - b. German.
 - c. Icelandic.
 - d. Gothic (extinct).
 - e. Dutch.
 - f. Swedish.
 - g. Danish.
7. Celtic Nations.
 - a. Welch.
 - b. Gaelic.
 - c. Irish.
 - d. Breton.
8. Slavonic Nations.
 - a. Polish.
 - b. Bohemian.
 - c. Russian.
9. Lithuanian.

II. SEMITIC BRANCH—CHARACTERISTIC.

1. Northern Section.
 - a. Assyria.*
 - b. Babylonia.*
 - c. Hebrew-Samaritan, Moabites.
 - d. Phœnician.
 - e. Carthaginian.
 - f. Aramaic—Chaldee, Syriac.
2. Southern Section.
 - a. Arabic—Arabia, Syria, Egypt, Barbary.
 - b. Himyaritic.
 - c. Amharic.

III. HAMITIC BRANCH.

1. Ancient Egyptians and descendants.
 - a. Copts.
 - b. Berbers.
 - c. Ethiopians.

NOTE.—*Language recovered by means of the cuneiform inscriptions.

TEST QUESTIONS ON RACES OF MEN.

What races of men have you seen?

Name the different nationalities of the white race.

Are the races as distinct and separate as they were originally? Why?

Which race is the smallest in number? The largest? Give reasons.

Which race is the most civilized? Give reasons. The most barbarous? Why?

To what race does the native Mexican belong?

What nationalities are known as the dark type of Caucasian? The fair type?

What was the native home of each of the races and what are some of the causes of their wide distribution?

To what race does each of the following belong: Swede, Hindu, Italian, Japanese, Esquimaux, Russian, Spaniard, native Filipino, Turk, Arab, Persian, Jew, Pole?

What are some of the wandering tribes of the earth and their location?

What do you understand by the terms savage? Semi-barbarous? Give examples of each.

How did the Aztec Indians compare with those of the United States?

How does the Ethiopian race differ from the Caucasian races, mentally, morally and physically?

Who are the Bushmen? Hottentots?

Why are the peoples of Asia as a rule so much behind European nations in progress?

What people of Asia has adopted European customs and with what result?

What part of Asia is inhabited by the Caucasian race? Why?

Why was America colonized long before Africa?

What characterizes the nations that live along the seacoast?

Describe the native Australian. To what race does he belong?

Of what race does the greater part of Australia consist? What has caused this?

In a barbarous country how do the inhabitants along the coast compare with those farther inland? Where are the most ignorant people found in Asia and Africa? Give reasons.

The Chinese form what per cent of the world's population?

Does the degree of civilization of a country depend upon its age? Give an example to illustrate your answer.

What has been the main cause for the distribution of the negro?

The immigrants of the United States represent what nations?

What effect does climate have on the races of men?

Why does the Caucasian race dominate the world? What are the chief factors in their progress?

By reference to the colored plates illustrating Mongolian and negro types which would you say represented the highest state of civilization?

If all the peoples of the world were stood in a line, every fourth one would belong to what country?

Judging from the appearance of the Masai type of negro in colored illustration, what would you say as to his civilization? What is striking about his head?

By referring to Figure Nine of the Mongolian types, what uncivilized practice do you note?

What is remarkable about the costume of the Kashmir type as seen in illustration? For what are these people famous?

Indians, American

Indian Affairs
 Indian, Education of the
 Indian Reservation
 United States Indian Training and
 Industrial School

Five Civilized Tribes.

Cherokee
 Chickasaw
 Choctaw
 Creek
 Seminole
 Osceola

Five Nations, The

Cayuga
 Huron
 Iroquoian Indians
 Mohawk

Oneida
 Onondaga

Seneca
 Tuscarora

Algonquian

Arapahoe
 Cheyenne
 Delaware
 Illinois

Kickapoo

Miami

Narragansett

Ojibway

Ottawa

Pontiac

Pequot

Pottawatomi

Athapascan

Caddoan

Muskogean

Shoshonean Indians

Moki

Siouan

DISTRIBUTION.

North America.

- (a) Canada
- (b) United States
- (c) Mexico

South America.

- (a)
- (b)
- (c)

DRESS.

Skins
 Woolens
 Feathers
 Shells
 Bark
 Tattooing

GAMES.

Ball
 Racing
 Canoeing
 Fishing
 Hunting
 Singing
 Dancing
 Wrestling

INDUSTRIES.

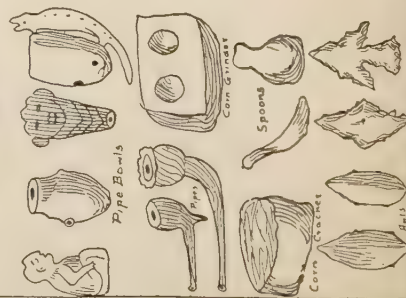
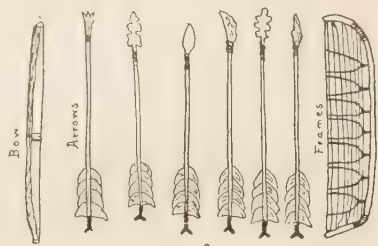
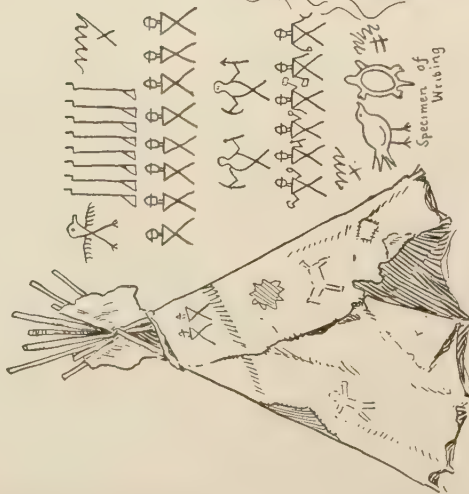
Blankets
 Baskets
 Pipestone
 Knives
 Arrows
 Fish-hooks
 Leather
 Pipes

BURIAL.

Earth
 Platforms

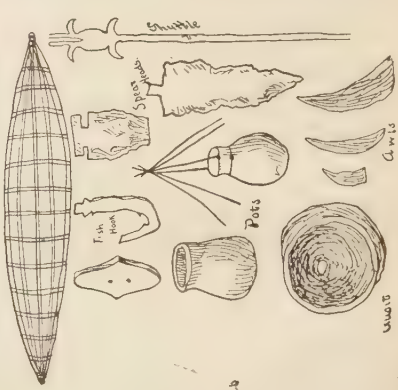
NOTE: It is to the credit of the indians of the United States that with but few exceptions they preferred death to any form of slavery or servitude, and have therefore maintained for the race final equality with the white men.

—Chancellor.



ABORIGINES OF AMERICA

Origin	Habits	Endurance
Number	Money	Microgyptics
Chronology	Inventions	Government
Etymology	Domestic Life	Tribal Relations
Civilization	Cultivation of Soil	Family Relations
Progress	Occupation	Clans
Education	Mode of Travel	Dwellings
Characteristics	Language	Divisions
Appearance	Records	Savage
Age	Archaeology	Barbarous
Size	Religion	Half Civilized
Perpetual Warfare	Disposition	



-Rough-

TEST QUESTIONS ON INDIANS.

Were horses used by the indians before the Spanish explorations?

Who gave indians their name? Why?

What are the indian tepees or wigwams? How were they made by the plains indians? By those in the lake region? Why the difference?

How many indians are found at present in North and South America? How many of this number resided in the United States in 1900?

How and of what material were the houses of the Pueblos constructed and how arranged? What was peculiar about the houses in the lower tiers?

Without doors and windows, how did the Pueblos gain entrance to their homes?

By close observation of the Pueblo types as shown in colored illustration, what arts would you say were highly developed by this tribe?

In time of ceremony how did the indians dress and decorate themselves? When and why did they paint their faces and bodies?

What tribe made maple syrup? The cultivation of corn, beans, squashes, etc., was practiced by what tribe? Which tribe cultivated tobacco? What tribe hunted extensively?

How and from what did the indians make knives? Fish hooks? Needles? Axes? Pipes? etc. What did they make from rushes and grass? What was remarkable about some of their baskets? Did they know the art of making leather?

What specimens of indian work have you in your home?

What games did the indian boy play common to his white brother? What was the highest ambition of the Indian boy?

Where were the dead generally buried? What was generally buried with the deceased?

What were the duties of the medicine man? What were the great spirits of the indians? How did they consider the wind? The rain? How did they regard every living thing?

What are indian reservations? How many in the United States? Where is the largest in the country? Are the indians of reservations citizens?

Name five of the principal indian tribes. Name three of the principal indian wars.

What indian maiden saved the life of Captain John Smith? Whom did she afterward marry?

What indian name has been made world famous in one of Longfellow's poems?

What is meant by indian summer?

By a study of the various types of the human race as shown in colored illustrations, how do the indians compare in dress and intelligence with the Mongolian? With the negro?

What did the indians of Mexico and Central America know of books, astronomy, arithmetic, etc., at the time the Spaniards invaded their country? How did their civilization compare with the Spaniards'?

Cliff Dwellers

- I. ORIGIN.
 - II. HABITATIONS.
 - 1. Kinds.
 - a. Cliffs.
 - b. Caves.
 - 2. Location.
 - a. Mexico.
 - b. New Mexico.
 - c. California.
 - d. Arizona.
 - 3. Construction.
 - a. Methods.
 - b. Material.
 - c. Shape.
 - d. Size.
 - 4. Purposes.
 - a. Domestic.
 - b. Protection in war.
 - 5. Ruins.
 - a. Relics.
 - b. Mummies.
 - c. Pottery.
 - d. Weapons.
 - e. Utensils.
- III. CIVILIZATION.
 - 1. Occupations.
 - a. Agriculture.
 - b. Irrigation—ditches, etc.
 - c. Manufactures.
 - 2. Government.
 - a. Tribes.
 - b. Chief.

TEST QUESTIONS.

- For what special purpose were the cave dwellings used? The cliff houses?
What other dwelling places have been found?
What proof have we of long sojourns in these places?
How many persons could a single "cliff palace" shelter?
What materials were used in the construction of their dwellings?
What do the circular ruins contain?
What are the theories regarding the use of the subterranean building in the center?
What determined the shape of the cliff houses? At what altitude were some of them built?
What have recent researches revealed as to their water supply? Ruins? Relics? Mummies?
What valley is strewn with ruins?
What strange symbols are to be seen on the walls?
What interesting discovery has been made by recent explorations?
What evidences of handicraft have been found?
Among what tribes was agriculture carried on?
What particular device shows their skill and industry?
What domestic animals did they raise?
Have the excavations ever resulted in the discovery of any metal objects?
Of what material were their weapons and other implements made?
What is a striking feature of their pottery?

The school makes possible the higher life when it teaches the pupil to think. Right thinking puts intelligence into the labor of his hands, increases his earning power, lays the foundation for his physical well-being, and lifts him above an existence that is a mere struggle for bread.

—Schaeffer.

Every book is a good book that sets the reader in a working mood. The deep book, no matter how remote the subject, helps us best.
—Emerson.

The Arts

THE NEW PRACTICAL REFERENCE LIBRARY devotes much space to subjects relating to the FINE ARTS. The most casual observer and reader will admit we are indebted to countless generations for our present state of civilization. That we should know of their unceasing struggles for success seems proper and fitting. No channel affords a better means for such knowledge than a knowledge of the FINE ARTS.

The general articles on ARCHITECTURE, SCULPTURE, PAINTING, MUSIC, etc. (elsewhere outlined), are interestingly and fully treated. Throughout each article will be found innumerable cross references, which, if looked up, will give a broad and clearly defined conception of these important branches of knowledge.

The parent or teacher will find it easy to arouse deep interest on the part of the boy and girl by beginning with queries closely associated with their own surroundings. For instance, questions such as these: "In what style of architecture is the schoolhouse built? The city hall? The court house? Your home?" "Is this picture done in water color or oil?" "When, where and by whom was the first piano made?" etc., will not only create the proper degree of interest but will stimulate observation and develop a desire to know more and more of these branches which ultimately will lead the young student to trace each branch to its earliest known history. It is only by knowing the past that we can fully understand and appreciate the present.

Through the study of architecture and sculpture we get glimpses of the life, customs, education, civilization, religious beliefs and ambitions of the early peoples of Egypt, Greece and Rome, as revealed by their magnificent tombs, their massive pyramids with their hieroglyphics, their obelisks, and their gods of idolatrous worship.

The natural and refining influence gained in the study of music and art, the delving into the biographies of world-famous musicians and artists, are indispensable acquisitions, to say nothing of the broadening effect to one's knowledge.

By the proper use of THE NEW PRACTICAL REFERENCE LIBRARY in any home or on the desk of the teacher, a study of, and an intimate acquaintance with, these important branches of human activity becomes not only possible but delightfully pleasant.

Architecture

The study of ARCHITECTURE is as important as it is instructive and interesting. The student who reads the interesting article on PYRAMIDS and correlated subjects in THE NEW PRACTICAL REFERENCE LIBRARY must be profoundly impressed with the ability and skill displayed by the nations of the long ago, and lost in fascinating wonder when he dwells on the genius of that time as illustrated by the raising, moving and proper adjusting of slabs of marble and granite, weighing hundreds of tons, for the temples and tombs, tasks beyond the accomplishment of the most skilled architect and engineer of our times, aided by twentieth century inventions.

It is our aim to give a mere skeleton to the study of ARCHITECTURE, leaving the searcher for knowledge the pleasant and profitable task of outlining the various phases of this study as extensively as desired. All the principal buildings of the world, such as WESTMINSTER ABBEY, are each fully described under their proper headings and thus furnish the teacher and pupil an inexhaustible field for interesting study.

ARCHITECTURE—ANCIENT AND MEDIEVAL.

EGYPTIAN ARCHITECTURE. ORIENTAL.

Style.	Style.
Construction.	Endurance.
Permanency.	Towers.
Religious belief.	Monasteries.
Tombs.	Pagoda.
Temples.	
Pyramids.	
Statues.	
Hieroglyphics.	

CHALDEAN-ASSYRIAN.

Construction.
Sun-dried brick.
Carved stones.
Stucco.
Vaults.
Arches.

GOthic.

Origin—time—place.
Characteristics.
Decorations.
Painted arch.
Examples.
Notre Dame, Paris.
Cathedral Cologne.
Cathedral Rheims.

GREEK.

Style.
Beauty.
Simplicity.
Harmony.
Period of perfection.
Orders.
Doric.
Ionic.
Corinthian.
Sculpture.
Painting.
Column.
Examples.
Parthenon.
Erectheum.
Theseum.
Theater.

ROMAN.

Aqueducts.
Sewers.
Amphitheaters.
Magnificent villas.
Triumphal arches.
Monumental pillars.
Thermæ (baths).
Examples.
1. Colosseum.
2. Pantheon.

BYZANTINE.

Time and place of origin.
Dome.
Examples.
Sophia, Church of
Saint.
Saint Marks, Venice.

ROMANESQUE.

Semi-circular arch.
Towers.
Porches.
Crypts.
Ornamental façades.
Rib.
Examples.
Church of San Ambrogio.
Cathedrals at Speyer and Worms.
Correlated subjects:
Cathedral.
Window.

The subjects listed below will be found interestingly treated in THE NEW PRACTICAL REFERENCE LIBRARY. The reader will in turn be referred to other correlated subjects which, if looked up, should make the study of ARCHITECTURE delightfully complete and entertaining.

Acropolis.	Basilica.	Indian architecture.
Arch.	Amphitheater.	Roof.
Acoustics.	Carving.	Spire.
Aqueduct.	Catacombs.	Window.
Bridges.	Column.	Pyramid.
Building.	Cathedrals.	Temple.
Dome.	Church.	Stadium.
Façade.	Frescoes.	Crypt.
Hall.	Mosaics.	Sphinx.
Babel, Tower of.	Theater.	Forum.
Baptistry.	Vault.	Pagoda.
Buttress.	Campanile.	Elizabethan architecture.
Colosseum.	Gable.	

QUESTIONS.

What is architecture? To what remote period can we trace it?

In what style of architecture is your church built? Your schoolhouse? Your county court house? Your city hall? Your state capitol? The National Capitol at Washington?

For how many years did Cheops employ one hundred thousand men to erect the great pyramid? How many acres does it cover?

What is yet the height of the great pyramid? What does its interior contain?

What special claim have the Egyptians to distinctive architecture? Was architecture their supreme art?

With what were the temples, tombs and statues of Egypt decorated?

Why were the tombs of the Egyptians built so strong that time could not destroy and enemies could not rifle them?

What place in Egypt because of its many pyramids is called the "Westminster Abbey of Egypt"?

What is the generally accepted belief as to the construction of the pyramids? How did the length of a king's reign affect the size of the monument?

Describe the Greek sphinx of mythology.

What riddle did the sphinx of Grecian mythology propose and who guessed it?

How were the Buddhist temples built out of solid rock?

What characterized the early Greek architecture? Who were the three great architects of Greece?

How would the seating capacity of the larger Greek theaters compare with those of today?

The Parthenon in the Acropolis at Athens is said to be the most perfect building ever erected. When was it built? Of what material? How long is it? How broad? How high? How many pillars did it originally have?

How did the Roman amphitheater differ from the Grecian theater?

What were the thermæ? What have the excavations at Pompeii revealed as regards the arrangements of the Roman dwelling house?

Describe the Pantheon at Rome. What is strikingly unique about its

magnificent dome? What famous painter is buried within its walls? What arch built about 500 B. C. can still be seen in Rome?

What models of nature are used for decorations on the Gothic style?

What group of recent buildings were unexcelled in their architectural beauty of design?

Sculpture

The outline on SCULPTURE is made brief from lack of space. The student and reader, however, can delve deeply into this interesting and instructive department by referring to the scores of correlated subjects in THE NEW PRACTICAL REFERENCE LIBRARY. For example, if detailed information is wanted about the characteristic Egyptian sculpture, the student will refer to the articles on SPHINX, PYRAMIDS, TOMB, OBELISK, HIEROGLYPHICS, etc. If the details of the Grecian style of sculpture are desired, one is referred to the PARTHENON, CLEOPATRA'S NEEDLE, etc., and to the famous Greek sculptors, LYSIPPUS, PHIDIAS, etc. If the detailed history of sculpture in our own country is sought, ample information will be found in looking up the biographies of noted sculptors, like SAINT GAUDENS, LORADO TAFT, BROWNE, etc.

SCULPTURE.

I. KINDS.

1. Carving.
 - a. Methods.
 - b. Materials.
2. Modeling.
 - a. Construction.
 - b. Casting.
 - c. Materials.

II. FORMS.

1. In the round. Object stands how? Give example.
2. In relief. Object projects in what manner? Give example.
3. In intaglio. Cut how?

III. HISTORY.

1. Egypt—Characteristics—Type.
2. Assyria—Compare with Egyptian—Lacking in what?
3. Greece.
 - a. Early period—Character—Style.
 - b. 500 B. C.—Progress—Aim—Blending of what?
Sculptors—Art reached perfection when?
Masterpieces. Name three.
 - c. 350 B. C.—Aim.
Masterpieces. Name them.
Sculptors. Name three.
4. Italy.
 - a. Early period—Imitation of what style?
 - b. Twelfth century—Characteristics—Aim.
Masterpieces. Name the three most famous.
Sculptors. Who were the most noted? Of these the most famous?
 - c. Eighteenth century—Progress—Aim—Results.
 - d. Modern—Aim.
Masterpieces. List four of the most famous.
Sculptors. Name four.

5. France.
 - a. Early period—Status.
 - b. Fifteenth to eighteenth century—Aim—Influence.
 - c. Modern school.
Sculptors. Name four, with masterpieces of each.
6. Germany.
 - a. Early period—Status—Lacking in what?
 - b. Renaissance—Style—Name four sculptors.
 - c. Modern school—Influenced by whom?
Sculptors, and masterpieces of each.
7. England.
 - a. Early period—Scope.
 - b. English school dates from what time?
 - c. Nineteenth century—What spirit pervaded English art?
 - d. Modern school—Style—Aim.
Sculptors. Name five and give masterpieces of each.
8. United States.
 - a. Modern school—Style—Aim—Results.
Sculptors. List five of America's most famous sculptors.
Masterpieces. Give location of five masterpieces. By whom?

QUESTIONS.

What is sculpture?
 What are the materials most generally used?
 In what country was sculpture first practiced?
 What specimens of this early period exist today?
 When does the sculptor's work proper end?
 What is the characteristic of American sculpture?
 How has sculpture aided us in knowing of the early history of the world?
 What are the three forms of sculpture usually recognized?
 To what form does the sculpture in your city belong?
 What are the most famous statues by Saint Gaudens? Where located?
 Who made the famous "Liberty" statue? What is its height? What is remarkable about it?
 What are the principal works of Thorwaldsen?
 What is the striking characteristic of his "Christ the Comforter" (see full-page illustration), and where found?
 In what museum is the statue illustrating "The Dying Gaul" placed? (See full-page illustration.)
 For what is Lorado Taft noted? Greenough? Browne?

NOTE.—Biographies of the following list of sculptors will be found interesting. Others may be added as your time will permit.

Phidias.	Ghiberti.	Canova.	Schadow.
Praxiteles.	Donatello.	Houdon.	Partridge.
Lysippus.	Vinci.	Bartholdi.	Dupre.
Greenough.	Michelangelo.	Kraft.	Thorwaldsen.
Ward.	Bernini.	Taft.	Daniel French.
Foley.	Browne.	Flaxman.	William Story.
Cellini.	Saint Gaudens.	Hosmer.	Drake.
Gibson.	Crawford.	John Rodgers.	Randolph Rodgers.

Painting

The general article on painting in THE NEW PRACTICAL REFERENCE LIBRARY gives a comprehensive review of the development of this fascinating art from the earliest times in the different nations as exemplified by the various schools.

The student will find it a pleasant task to acquaint himself by aid of this satisfactory guide with this delightful branch of human knowledge. He will find interesting, instructive biographies of all the noted painters under their respective titles from the earliest times to those of the present day, with mention and description of their masterpieces.

That such a fund of knowledge is in itself a source of pleasure is self-evident. That it has a natural refining and elevating influence no one can gainsay. To live but for a few brief minutes daily in the atmosphere and have for silent companions MICHELANGELO, RAPHAEL, RUBENS, LANDSEER, ROSA BONHEUR, and scores of others, must broaden the intellect, quicken the imagination, sweeten the heart and inspire to nobler ambitions.

It certainly should be the pleasant duty of every parent and teacher to create and foster a love for all that is beautiful in art as in literature.

PAINTING.

DIVISIONS.	MATERIALS USED.	HISTORY.
Decorative.	Oil.	Ancient Period.
(a)	Wood panels.	In Egypt.
(b)	Canvas.	On Tombs.
Portrait.	Water Color.	Temples.
Genre.	Paper.	Mummy Cases.
Landscape.	Fresco.	Papyrus.
Seascape.	Wet plaster.	Representative of what.
Architectural.	Tempera or Distemper.	In Greece.
(1)	Enamel.	In Rome.
(2)		Pompeii.
	TWELVE GREAT PAINTINGS.	The Baths.
GREAT PAINTERS (which see).	Transfiguration.	The Tombs.
Giovanni Cimabue.	Sistine Madonna.	The Catacombs.
Van Eycks.	Raphael.	Byzantine Decorations.
Hans Membling.	Last Judgment.	Mediæval Period.
Leonardo da Vinci.	Michelangelo	Renaissance Period.
Michelangelo.	Communion of Saint Jerome.	Schools—
Titian.	Descent from the Cross.	Florentine School.
Fra Bartolomeo.	Rubens.	Venetian School.
Andrea del Sarto.	Descent from the Cross.	Umbrian School.
Rembrandt.	Volterra.	Roman School.
Raphael.	Last Supper. Vinci.	Sixteenth Century.
Correggio.	Assumption of the Virgin. Titian.	Later Periods.
Burne-Jones.	The Night.	History in United States.
Whistler.	Correggio.	
Landseer.	Aurora.	
Sargent.	Beatrice Cenci.	
Murillo.	Guido Reni.	
	Immaculate Conception.	
	Murillo.	

QUESTIONS.—PAINTING.

What is the art of painting? What is oil painting? Water color? Fresco? Enamel? How produced?

How and on what were the early paintings of the Egyptians, Greeks and Romans executed?

How many centuries before Christ was painting practiced in Egypt? Was the art closely related to religion and a result of it? In what relation was it held to sculpture and architecture?

What do these early Egyptian paintings generally represent and on what were they generally pictured?

Was any attempt made by these artists to imitate nature?

Of what great historic value are these early Egyptian paintings? Give three reasons for your answer.

By whom were the principal works of Roman art produced?

Describe the conditions of Roman painting for the first three centuries after Christ.

What were the Catacombs (see)? How were they built? Decorated? Protected? Inhabited?

By what art in the Catacombs did the early Christians indicate their religious devotion?

Who was one of the first great English painters?

What does the Umbrian school characterize?

What was striking about the Florentine school?

When did art in the United States take on an individuality of its own?

What are the strikingly distinguishing marks between American art of 1855 and 1900?

Name five well-known American painters, with a great painting from each. For what was Whistler noted?

What are the twelve greatest paintings in the world; by whom, where found, and when produced?

What kinds of knowledge are requisite in a painter?

What discovery of the Van Eycks produced a revolution in the art of painting?

By what process are mosaics made?

Where are the early Egyptian paintings found and what is their character?

What are the only examples of pure Grecian painting?

What was the Byzantine influence on painting?

What did the Renaissance do for Italian painting?

Why was Italian art of the fifteenth century often better than any that followed?

What was the greatest period in the history of modern art? What brought about a decline?

What are the chief names in the history of nineteenth century painting?

What is the general process of fresco painting? When was its greatest development?

What was the first or mosaic method of making ornamental glass windows?

What is the combination method of today?

What are the distinguishing features of Byzantine art?

What is meant by the Rembrandt style of picture?

Music

In THE NEW PRACTICAL REFERENCE LIBRARY the department of music is under three heads: musical terms, musical instruments, and biographies of musicians. The general article *Music* contains the subheads: NATURE AND TERMINOLOGY OF MUSIC, NOTATION and HISTORY, the last subdivision containing references to the greatest of the world's musicians of all times.

The list of terms given in the outline under the subhead musical terms contains but a small proportion of the articles included in the encyclopedia. The article musical instruments is but a list of cross references to the most important instruments. Many of the biographies of the greatest composers, singers and instrumentalists may be reached by means of cross references from the general article *Music*. There are also in this department of music a number of general articles on such topics as *Hymns* and *Hymn Tunes* and *Hymns, National*.

MUSIC.

I. TECHNICAL.

1. Nature and theory of.
2. Terms used.
3. Notation or reading of.
4. Pitch and duration of tones.

II. MUSICAL TERMS.

1. Orchestra.
2. Opera.
3. Harmonics.
4. Oratorio.
5. Harmony.
6. Recitative.
7. Scale.
8. Singing, etc.

III. MUSICAL INSTRUMENTS.

1. Drum.
2. Cornet.
3. Violin.
4. Pianoforte.
5. Organ.
- Others.

IV. GREAT MUSICIANS.

1. Handel.
2. Beethoven.
3. Mendelssohn.
4. Bach.
5. Patti.
6. Sousa.
7. Nordica.
8. Kubelik.
9. Rubenstein.
10. Paderewski.

V. HISTORY.

1. Ancient.
 - Egypt.
 - Assyria.
 - India.
 - Greece.
 - Rome.
2. Modern.
 - German.
 - Italian.
 - Russian.
 - English.
 - Swedish.

CORRELATED SUBJECTS:

NOTE.—Consult names of all noted musicians under general subject "Music."

Also:

Jennie Lind.	Balfe.	Corelli.	Strauss.	Weber.
Auber.	Berlioz.	Schumann.	Schubert.	Offenbach.
Bach.	Chopin.	Myerbeer.	Wagner.	Others.

QUESTIONS.

Of the fine arts which is the finest and purest?

From what relative did Mme. Patti receive her musical training?

What popular opera has Sousa composed?

Under what familiar name did Madame Otto Goldschmidt appear?

What stage of music had England attained to in the time of Handel?
 What is the general character of the Scandinavian music?
 Why of all the arts does music appeal to the rank and file the most?
 What did each of the following nations try to emphasize in their music:
 Italy, Germany, England, Scandinavia and France?
 Why is music largely characteristic of the nation?
 What factor has Christianity been in the growth of music?
 What were some of the ancient musical instruments? Give a list of modern
 instruments.
 Give a list of the famous composers of music. A list of celebrated players
 of instruments. A list of singers, sopranos, tenors, bass.
 What is the record of Martin Luther in regard to music?
 Of what nationality is Kubelik? What has been his career? Of what in-
 strument is he a master?
 Of what nationality is Paderewski? How old is he? Of what instrument
 is he master?
 How old is Adelina Patti? How does she rank as a soprano?
 What great oratorio did Handel compose? How was this received at the
 time?
 What is the record of Theodore Thomas in Chicago? What in general was
 the aim of his work? What is Orchestra Hall? For what, and at what cost, was
 it erected?
 For what is Reginald De Koven noted?
 What part in singing does Edouard De Reszke take? What is his record?
 What part does Jean De Reszke take? Give his record.
 How does the violin rank as compared with other instruments?
 What is the meaning of oratorio? Give a list of celebrated oratorios.
 What is a military band? Who was the first celebrated leader of such bands?
 He has been succeeded by whom? What is the most celebrated military band
 in the United States?
 What is the national hymn of America, Germany, England, France, etc.?
 How is "Chopin" pronounced?

Engraving

The article *Engraving* is particularly complete in its cross references. A
 glance at the outline shows that the whole subject may be reached from the
 general article Engraving. Cross references under *Halftone* lead to the subject
 of *Photography*.

OUTLINE.

- | | |
|--|---|
| <p>I. ENGRAVING.</p> <p>1. Halftone.</p> <p style="padding-left: 20px;">a. Etching.</p> <p style="padding-left: 40px;">Engraving</p> <p style="padding-left: 40px;">Zinc Etching.</p> <p style="padding-left: 20px;">b. Photography.</p> <p style="padding-left: 40px;">Camera.</p> <p style="padding-left: 40px;">Electrotyping.</p> <p style="padding-left: 40px;">Lithography.</p> <p style="padding-left: 40px;">Photogravure.</p> <p style="padding-left: 40px;">Daguerreotype.</p> | <p>2. Zinc Etching.</p> <p style="padding-left: 20px;">a. Photography.</p> <p style="padding-left: 20px;">b. Halftone.</p> <p>3. Etching.</p> <p style="padding-left: 20px;">a. Engraving.</p> <p style="padding-left: 20px;">b. Zinc Etching.</p> <p>4. Mezzotint.</p> <p style="padding-left: 20px;">a. Engraving.</p> <p style="padding-left: 20px;">b. Etching.</p> |
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CORRELATED SUBJECTS.

1. Printing.
2. Halftone.
3. Etching.

4. Aquatint.
5. Mezzotint.
6. Photography.

7. Lithography.
8. Electrotyping.
9. Camera.

QUESTIONS.—ENGRAVING.

What is engraving? What materials are used?

What were the early uses of engraving?

Where and when did engraving for the purpose of printing originate? What material was used?

When and by whom was printing from metal plates discovered?

What was the importance and scope of engraving in early times?

What other processes have largely done away with this art? Describe them and tell of their importance at the present time.

What is the process of producing a wood engraving? An engraving from metal?

What is a zinc etching? Why are they used so largely to illustrate the daily papers?

When did photography first come into use? Who was Daguerre?

Compare the process of ancient engraving with those in use today.

What is an electrotpe? Lithograph? Halftone?

That which makes life worth living cannot be bought with money. If you are rich you may buy a fine house, but you cannot buy a happy home; that must be made,—made by you and by those who occupy it with you. With money you may rent a pew in some fashionable church, but you cannot rent a good conscience,—that depends upon your manner of living and dealing with others.

—Schaeffer.

The man who is fond of good books is usually
a man of lofty thought and of elevated opinions.
—George Dawson.

Astronomy

Astronomy is the science which treats of the heavenly bodies. A general survey of this subject, together with a short history, is given in the general article "*Astronomy*," which therefore forms a suitable introduction to the subject.

The other phases of the subject may be found in articles to which cross references are made in this general article, such as *Sun*, *Moon*, etc.

Definitions of the most important astronomical terms are also included in this first division, which is connected by means of cross references with all other subjects bearing upon this department.

The biographical department contains articles on all the chief astronomers and gives all the particular work which they accomplished.

The study of astronomy can be made not only very extensive but very interesting, even to the boy, by reference to our splendid outlines and the explanatory articles in THE NEW PRACTICAL REFERENCE LIBRARY.

The general subjects are of early interest to every child mind. The pupil comes into such vital contact with the planet on which he lives; the sun which brings life to the earth; the moon and stars which shed their silvery beams about his way; in fact, touching nature at all points of his environment, his interest is easily aroused, and such phenomena as *Day* and *Night*, the *Seasons* and other interesting subjects will be early introduced by the successful teacher.

The classified treatment here presented, together with the simplicity of the language, makes our work ideal for the home and school.

OUTLINE.

I. GENERAL.

1. Apsides.
2. Ascension, Right Declination.
3. Astronomy.
 - a. Asteroids.
 - b. Astro-Photography.
 - c. Comets.
 - d. Earth.
 - e. Moon.
 - Tides.
 - f. Planet.
 - g. Solar System.
 - h. Stars.
 - Constellations.
 - Zodiac.
 - Cassiopeia.
 - Orion.

- Milky Way.
- Bear, Great.
- i. Sun.
- j. Spectrum Analysis.
 - Spectroscope.
 - Light.
 - Rainbow.
 - Telescope.
4. Calendar.
5. Chromosphere.
6. Conjunction.
7. Eclipse.
8. Horoscope.
 - Astrology.
9. Kepler's Law.
10. Latitude.
 - a. Antarctic Circle.

- b. Equator.
 - c. Tropics.
 - 11. Longitude.
 - 12. Meteor.
 - 13. Metonic Cycle.
 - 14. Nebula.
 - Nebular Hypothesis.
 - 15. Node.
 - 16. Nutation.
 - Precession of the Equinoxes.
 - 17. Observatory.
 - 18. Parallax.
 - 19. Pole.
 - 20. Transit.
 - 21. Universe.
- II. DIVISIONS OF TIME.
- 1. Day.
 - a. Divisions.
 - b. Sidereal Day.
 - c. Solar Day.
 - d. Civil Day.
 - 2. Week.
- IV. BIOGRAPHIES OF ASTRONOMERS.
- | | | | |
|----------|----------|------------------|------------------|
| Ptolemy. | Kepler. | Newton. | Herschel, Sir J. |
| Brahe. | Galileo. | Herschel, Sir W. | Halley. |
- V. GENERAL DIVISIONS.
- 1. Descriptive Astronomy.
 - a. Description of the
 - Motions.
 - Figures.
 - Periods of revolution.
 - Other phenomena of the heavenly bodies.
 - 2. Practical Astronomy.
 - a. Teaches how to observe the
 - Motions.
 - Figures.
 - Periodical revolutions.
 - Distance of the heavenly bodies.
 - How to use necessary instruments.
 - 3. Physical Astronomy.
 - a. Explains cause of motions.
 - b. Demonstrates laws by which causes operate.
 - 4. New Fields of Investigation.
 - a. Astro-Photography.
 - b. Spectrum Analysis.
- First Studied: Most remote period 2500 B. C.
 What remarkable phenomenon was recorded by the Chinese?
- VI. ASTRONOMY IN INDIA.
- 1. Annual motion of Jupiter and Saturn observed in 3000 B. C.
 - 2. Tables of the sun, moon and planets formed.
 - 3. Eclipses calculated.

- VII. TIME OF ALEXANDER THE GREAT.
1. Chaldeans had made astronomical observations for 1,900 years.
 2. Regarded comets as bodies traveling how?
 3. Predicted what?
 4. Had what acquaintance with the universe?
- VIII. PRIESTS OF EGYPT.
1. Gave astronomy what?
 2. Their ancient zodiacs.
 3. What is shown by position of their pyramids?
- IX. AMONG THE GREEKS.
1. Astronomy took scientific form.
 2. Thales predicted solar eclipse.
 3. Pythagoras (500 B. C.) promulgated theory that sun is center of universe.
 4. Great progress made under Ptolemies.
 5. Aristarchus (267 B. C.) taught double motion of the earth.
 6. Hipparchus (150 B. C.) undertook catalogue of the stars.
- X. SYSTEM PROPOUNDED BY CLAUDIUS PTOLEMY.
1. Earth was center of universe.
 2. Sun, moon and stars revolved around it.
 3. Sphere of moon nearest to earth.
 4. Spheres of planets next.
 5. Spheres of fixed stars followed.
 6. Two crystalline spheres succeeded these.
 7. An outer sphere circumscribed all, wherein happy souls found abode.
- XI. THE ARABS.
1. Began to make observations middle of eighth century.
 2. Continued in the science 400 years.
 3. Made important observations of the disturbances of Jupiter and Saturn (A. D. 1000).
- XII. NICHOLAS COPERNICUS. 1473-1543.
1. Introduced the system which bears his name.
 2. Gave to sun central place in solar system.
 3. Shows other bodies revolving around it.
 4. This arrangement came to be generally received.
 5. Substituted for complexities and contradictions of Ptolemy theory.
- XIII. TYCHO BRAHE, DANISH ASTRONOMER.
1. Regenerator of practical astronomy.
 2. Through his aid Kepler arrived at the following laws:
 - a. That planets move in elliptical orbits, of which the sun occupies position of focus.
 - b. That the imaginary straight line joining the sun and any planet moves over equal space in equal time.
 - c. That the squares of the times of the revolutions of the planets are as the cubes of their mean distances from the sun.
- XIV. GALILEO.
1. Advanced the science how?
 2. Established the truth of what theory?
 3. Death occurred when?
- XV. NEWTON.
1. Born when?
 2. Did what for physical astronomy?
 3. Deduced what theory?

XVI. EIGHTEENTH CENTURY.

1. The science enriched by Herschel's discovery of what?
2. Resolution of the Milky Way into myriads of stars.
3. Unraveling of the mystery of nebulae.
4. Double and triple stars.
5. The analytical researches of Lalande, Lagrange, Delambre, Laplace.

XVII. NINETEENTH CENTURY.

1. Discovery of first four minor planets.
2. Existence of Neptune, more distant from the sun than Uranus.
3. Use of spectroscope and photography in investigation.
4. Former calculated distance of sun corrected.
5. Discovery of the two satellites of Mars.
6. Existence of an intra-Mercurial planet, named Vulcan, has not yet been verified.
7. Much work accomplished in ascertaining the parallax of fixed stars.

XVIII. ASTRONOMICAL TOPICS.

- | | | |
|---------------|------------------|-----------|
| 1. Asteroids. | 4. Moon. | 7. Stars. |
| 2. Comets. | 5. Planet. | 8. Sun. |
| 3. Earth. | 6. Solar System. | |

XIX. WORKS OF REFERENCE.

- Proctor's "Other Worlds Than Ours."
"Half Hours with the Stars."
Flammarion's "Astronomy for Amateurs."
Young's "The Sun," "Astronomy."

QUESTIONS.

What would be your weight on the sun's surface? On the moon's?

What planet gives out 6,000 times more light than the sun and is 100 times larger in diameter?

Which is larger, the sun or the north star?

How many years would it require a train running 60 miles an hour without a stop to reach the sun?

What is the distance of the sun from the earth? The moon? The nearest star?

What is said to be the height of the mountains on the moon? How do they compare with our highest peaks?

How does the length of the days and nights on the moon compare with our own?

By the use of the most powerful telescope how near is the moon brought to the earth?

What is called the lines of apsides? What is its peculiar motion? Is this motion the same in all planets?

What time is represented by the anomalistic year? Which is the longer, the anomalistic or the sidereal year? How much longer?

How does the diameter of the largest of the asteroids compare with that of the earth?

NOTE.—Representing the sun by a globe two feet in diameter, the earth would be twenty-two hundredths of an inch in diameter—the size of a very small pea or a "twenty-two caliber round pellet." Its distance from the sun on that scale would be just 220 feet, and the nearest star (still on the same scale) would be 8,000 miles away at the antipodes. —Young's "Astronomy," page 174.

NOTE.—If a boy could walk four miles an hour, or forty miles in a day of ten hours, it would require 730 days, or two years, to walk around the globe. To walk to the moon would require 7,000 days, or about twenty years.

While there are more than 270 asteroids now discovered, how does their total mass compare with that of the earth?

What was the first record of an astronomical event, and its very ancient date?

What ancient people were probably acquainted with the true system of the universe?

With what people did astronomy take a somewhat scientific form?

Which of the Greeks taught the motion of the earth around its axis and around the sun?

When do meteors most frequently occur?

From what century does the present astronomical system date?

What is Aquarius, and when is the sun said to enter it?

What has been the most remarkable recent discovery in regard to comets?

In what manner is the term "earth shine" described?

What is the cause of an eclipse of the moon? Of the sun?

What is the average number of eclipses in a year?

Describe the term "coal sack," observed in the Galaxy, or what is commonly known as the Milky Way.

What is the course and the cause of the Milky Way?

What is the harvest moon?

What is the average diameter of the planet Jupiter?

What was the very valuable discovery regarding light made from observing Jupiter's satellites?

What is the theory concerning the distribution of water and land on the planet Mars?

What is the rare form of metal which is found in meteoric stones?

What are the gray plains of the moon?

To whom is the nebular hypothesis due? How is it now received by astronomers?

When and by whom was Neptune discovered? Is it visible to the naked eye?

How does the magnitude of the star Sirius compare with that of the sun?

What is the precession of the equinoxes?

What is computed to be the amount of light sent out from the sun?

Which of the planets has rings supposed to be made up of multitudes of satellites?

What festivals are survivals of sun-worship?

By what combination of principles is the telescope able to aid the eye?

What is the largest telescope in the world?

How short a day has Uranus and how long a year?

What two names did the ancients give Venus because of its alternate appearance in the morning and evening?

What is the zodiac? How was it divided by the ancients and what are the divisions called?

What is zodiacal light?

What two new fields of astronomical investigation have been opened up in recent years?

How has spectrum analysis helped establish the nebular hypothesis?

What star is approaching us and what one is receding from us?

How many years does it take light to come from the nearest star to us?

Why are some stars called variable, others temporary and others the fixed stars?

Which planet approaches nearest the earth?

To what two men is the systematizing of astronomy due?

What discovery of Newton practically completed the proof of the Copernican theory?

Why was Copernicus excommunicated by the pope?

Why is it more satisfactory to study the movements of the heavenly bodies by astro-photography than through the telescope?

What are the three main branches of astronomy? Which one of these divisions gives a description of the motions and figures of the heavenly bodies? Which division teaches us to observe the revolutions of the heavenly bodies? Name the division of astronomy which explains the causes of the motions and demonstrates the laws by which these causes operate.

What is the difference between an observatory and a laboratory? Where is the famous Yerkes observatory?

Who invented the telescope?

What led Galileo to observe the laws governing the oscillation of the pendulum? To what important discovery did this lead?

Why do we regard the sun as the most important of the fixed stars?

What is the diameter of the sun?

A borrowed book is but a cheap pleasure, an unappreciated and unsatisfactory tool. To know the true value of books, and to derive any satisfactory benefit from them, a child must feel the sweet delight of buying them,—he must know the preciousness of possession.

Learn to be a good reader, which is perhaps a more difficult thing than you imagine. Learn to be discriminative in your reading; to read faithfully, and with your best attention.

—*Carlyle.*

No profit grows where is no pleasure taken.
—*Shakespeare.*

Athletics

The American parent and teacher invariably encourage a desire for manly, healthy sports and pastimes in the child, and, indeed, this would be a dreary world if everybody worked all the time and never took any recreation; so, too, might this be called a dull work did it not devote special treatment to this subject.

With the above thought in view THE NEW PRACTICAL REFERENCE LIBRARY gives space to these subjects, treating them in an interesting way, emphasizing the point that such sports and pastimes are not only recreation but are intellectual and developing in their nature.

We divide this subject into several classes, and briefly outline the subject of *Football*.

OUTDOOR GAMES.

Ball, Baseball; Cricket, Football, Archery, LaCrosse, Quoits, Polo, Bowls, Croquet, Curling, Tennis, Golf.

INDOOR GAMES.

Billiards, Casino, Cribbage, Whist, Chess, Checkers, Dominoes, Legerdemain.

SPORTS.

Rowing, Bicycling, Swimming, Boxing, Olympic Games, Gladiators, Coliseum, Chariot.

ATHLETIC TRAINING.

Gymnastics, Calisthenics, Wrestling, Dancing.

MISCELLANEOUS.

Games, Angling, Palmistry, Opera, Nimrod, Muscum, Fencing, Theater, Yacht.

Football

I. GENERAL DESCRIPTION.

I. Sides.

- a. Number of men.
- b. Position.
- c. Duties.
- d. Movements.

Scrimmage.

Punting.

- e. Rules.

f. Restrictions.

g. Scoring.

- Touchdown.
- Goal.
- Field goal.
- Safety.

II. ANCIENT.

1. Rome.

2. Greece.

III. MODERN.

I. United States.

- a. Participants (colleges and universities chiefly).
- b. Season.
- c. Places of contest.

2. England.
 - a. Rugby.

IV. VALUE.

1. Sporting.
2. Hygienic.

Strength, endurance, speed, agility, quickness of thought, etc.
3. Moral.
 - a. Sense of honor quickened.
 - b. Body brought to perfection.
 - c. Temperance, self-denial, etc.

QUESTIONS.

If you were making application for membership to an important football team what requirements would you have to possess to be accepted?

How does football compare in popularity with baseball? Is it known as a national game?

What is now the length of a football half?

At what season is the game played in the United States, and as a rule by whom?

What is meant by the terms: touchdown, quarterback, halfback, coach, etc.?

What late movement has resulted in eliminating unnecessary violence and liability to injury?

What are the points in favor of this game? In what manner is it particularly beneficial to the participant? To the spectator?

What national holiday in some parts of the United States marks the closing of the football season?

Name physical qualities necessary for one to participate in this game.

What is said to be the national game of the United States?

What nation apparently seems to be leading in athletics?

What outdoor game is adapted to both sexes?

Cricket is the national game of what country?

Why does golf recommend itself as an outdoor game?

What sports are followed in connection with water?

Give reasons for outdoor sports gaining in popularity. Where is this especially true? What good results will follow?

Aside from pleasure what benefits accrue from rowing? Swimming? Tennis? Skating? etc.

How do the schools regard this subject? What are some of the late developments along this line?

Compare the games of ancient with those of modern days in their effect on health, intellect and morals of the nation.

Mention games whose chief instrument is the ball, boat, gun, horse, etc.

What are some of the far-reaching effects on a nation whose people engage in outdoor recreation?

Are interest and enthusiasm necessary in what is known as gymnastics in our common schools? Why?

“To impose on a child to get by heart a long scroll of phrases without any ideas is a practice fitter for a jackdaw than for anything that wears the shape of a man.”

A little library growing larger every year is
an honorable part of any child's history.

—Henry Ward Beecher.

Biography

We now call your attention to a department of school work which appeals to every true teacher and to every wide-awake boy and girl, the department of BIOGRAPHY. The educators who planned this work realize how intensely interesting the lives of great men and women are to young people, in fact to every one.

We include with these biographies portraits of many of these eminent people whose unselfish lives must forever remain an inspiration to others.

Particular attention has been paid to adapting it to the wants of American readers and of the present time. It will be found that many names are included of persons recently brought into prominence who are the subject of daily inquiry in this country but of whom no mention can be found in the more pretentious and bulky reference works.

We give over 3,500 biographies. It has been the endeavor of the editor to make the collection so complete that this biographical information will answer every demand made upon it by the student, and the great extent of the work makes it possible in this course to merely indicate a brief classification which if chronologically arranged would present a history of human activity in the field of art, literature and science.

In the following biographical outline we have merely noted a few names in connection with the classification. This list may be added to as you refer to THE NEW PRACTICAL REFERENCE LIBRARY. In the biographies you will find the most salient points in each career have been touched, and no person can arise from a perusal of such lives without feeling his whole mind and heart made better and his best resolutions strengthened; thus it is impossible to say where a good example may not reach, or where it will end, if indeed it have an end.

Classified List

- ACTORS—Garrick, Irving, Booth, Bernhardt, Mansfield, Marlowe, Adams.
ADVENTURERS AND DISCOVERERS—Columbus, Abruzzi, Cortez, Livingstone, Magellan, Stanley, Drake, Kidd, Peary, Nansen.
ALCHEMISTS—Agrippa, Bacon, Paracelsus, Lavoisier, Priestly.
AMERICANS, GREAT—Franklin, Henry, Washington, Lincoln, Garfield, Lee, McKinley.
ANTI-SLAVERY LEADERS—Wilberforce, Garrison, Phillips, Fremont, Stanton.
ARTISTS—Giotto, Schnorr, Ruysdaal, Copley, West, Vinci.
ASTRONOMERS—Herschel, Tycho Brahe, Kepler, Newton, Young, Halley, Laplace, others.
AUTHORS—Homer, Dante, Luther, Shakespeare, Chaucer, Bacon, Milton, Goethe, Cervantes, Scott, Dickens, Tennyson, Kipling, Irving, Bryant, Longfellow, Howells, Twain, Riley, Aldrich, others.

BIBLE CHARACTERS—David, Jews, Paul, Moses, Jesus, God, Abraham, John, etc.
 BOTANISTS—Huxley, Tyndall, Humboldt, Burbank, Pliny, Ray, Linnæus, Brown, Gray.
 CHEMISTS—Priestly, Cavendish, Dalton, Humboldt, Faraday, Professor and Madam Curie, Pasteur.
 COLONISTS—Drake, Raleigh, Smith, DeSoto, Balboa.
 CONFEDERATE STATESMEN—Davis, Stephens, Breckenridge, Benjamin, others.
 DETERMINATION, MEN OF—Palissy, Galileo, Burritt, Carlyle, Bunyan, Arkwright.
 DILIGENCE, MEN OF—Buffon, Jenner, Franklin, Wellington, Irving.
 DIVINES—Abbott, Beecher, Campbell, Moody, Parker, Sankey, Talmage, Hillis, Gunsaulus.
 DRAMATISTS—Jonson, Dumas, Schiller, Æschylus, Ibsen.
 ENGLISHMEN, GREAT—Grey, Elizabeth, Cromwell, Anne, Pitt, Victoria, Gladstone, Balfour.
 ENGLISH WRITERS—Bacon, Chaucer, Caxton, Gibbon, Ruskin, Tennyson.
 FINANCIERS—Patterson, Rothschild, Morris, Gage, Morgan, Carnegie, Sage, Rockefeller, Shaw.
 HISTORIANS—Plutarch, Herodotus, Macaulay, Gibbon, Parkman, Guizot, Hume, Bryce.
 ILLUSTRATORS—Darley, Nast, Cruikshank, McCutcheon, others.
 INTEGRITY, MEN OF—Diogenes, Burke, Arnold, Jackson, More, Wilberforce.
 INVENTORS—Davy, Fulton, McCormick, Vinci, Edison, Marconi, Tesla, Maxim, Noble.
 JOURNALISTS—Franklin, Greeley, Bennett, Dana, Watterson, Young, Pulitzer, Medill.
 KINGS—Charlemagne, Cæsar, Alexander, Bonaparte, Henry VIII, George III, Edward VII.
 LAWYERS—Moses, Confucius, Lycurgus, Blackstone, Webster, Solon, Knox, Choate.
 LIBRARIANS—Poole, Spafford, others.
 LOGICIANS—Mill, Hegel, Kant, Leibnitz, others.
 MATHEMATICIANS—Pythagoras, Archimedes, Legendre, Newton, Gunter, Lord Kelvin.
 MERCHANTS, FAMOUS—Law, Hudson Bay Co., Astor, Girard, Morris, Wanamaker, Field.
 MISSIONARIES—Xavier, Elliot, Moffat, Livingston, John the Baptist, Jesuits.
 MUSICIANS—Patti, Lind, Beethoven, Mendelssohn, Strauss, Paderewski, Wagner, Mozart, Kubelik.
 NOBLE MOTIVES, MEN OF—Lincoln, LaFayette, Garrison, Whittier, Greeley.
 NOVELISTS—Balzac, Andersen, Bjornson, Cooper, Dumas, Tolstoi, Stevenson, Eliot, others.
 ORATORS—Demosthenes, Cicero, Antiphon, Burke, Henry, Webster, Bryan, Beveridge.
 PAINTERS—Michelangelo, Titian, Rembrandt, Raphael, Correggio, Burne-Jones, Whistler, Sargent, Murillo, others.
 PATIENCE, MEN OF—Columbus, Hampton, Raleigh, Kossuth, Audubon, Harvey.
 PATRIOTS—Bruce, Washington, Moore, Pitt, Gladstone, Davis, Kosciusko, Joan of Arc.
 PHILANTHROPISTS—Barnardo, Childs, Cooper, Durant, Hirsch, Girard, Peabody.
 PHYSICIANS—Hahnemann, Virchow, Harvey, Pasteur, Senn, Lorenz.
 POLITICAL ECONOMISTS—Mill, Martineau, Franklin, Bagehot.
 PREACHERS—Chrysostom, Kempis, Xavier, Wycliffe, Wesley, Spurgeon, Moody.
 PRECISION, MEN OF—Poussin, Cuvier, Titian, Brougham, Pope, Disraeli.

PRESIDENTS—(See them.)

PRINTERS—Gutenberg, Caxton, Elzevir, others.

PRISONERS' FRIENDS—Vassar, Howard, Fry, Nightingale.

PSYCHOLOGIST—Aristotle, Berkely, Cousin, Hegel, Hume.

REFORMERS—Stanton, Anthony, Blackwell, Bloomer.

RELIGIOUS LEADERS—Wycliffe, Luther, Calvin, Abbott, Parkhurst.

RULERS—Alexander, King Edward, Loubet, Diaz, Nicholas II.

SCIENTISTS—Harvey, Gesner, Ray, Buffon, Cuvier, Agassiz.

SCULPTORS—David, Raphael, Hosmer, Powers, Greenough, Donatello, Thorwaldsen, Phidias, Bartholdi, Saint Gaudens.

SOCIAL REFORMERS—Adler, Bradlaugh, Gerry, Debs, Addams.

SOLDIERS—Hannibal, Cæsar, Cromwell, Grant, Jackson, Lee.

STATESMEN—Bolingbroke, Bismarck, Davis, Gladstone, Lincoln, Blaine.

TEACHERS—Quintillian, Erasmus, Pestalozzi, Mann, Murray, Parker.

TEMPERANCE ADVOCATES—Gough, Willard, others.

THEOLOGAINS—Zwingli, Luther, Xavier, Huss, Campbell, Beecher.

WARRIORS—Washington, Bonaparte, Alfred the Great, Charlemagne.

WOMAN SUFFRAGISTS—Stanton, Mott, Anthony, Bloomer.

YOUNG MEN, GREAT—Handel, Haydn, Mozart, Cervantes, Pope.

famous Women

Among the many famous women whose biographies are included in THE NEW PRACTICAL REFERENCE LIBRARY we submit the following list for your study:

Adams, Maude.

Addams, Jane.

Alcott, Louisa May.

Anthony, Susan B.

Aspasia.

Austen, Jane.

Barton, Clara.

Bernhardt, Sara.

Bonheur, Rosa.

Bremer, Fredrika.

Bronte, Charlotte.

Browning, E. B.

Burdett-Coutts, Baroness.

Cary, Alice and Phoebe.

Catharine de Medici.

Catharine, Empress.

Cenci, Beatrice.

Christina, Queen.

Corday, Charlotte.

Dudevant, Mme.

Eliot, George.

Elizabeth, Queen.

Gould, Helen.

Grey, Lady Jane.

Howe, Julia Ward.

Hypatia.

Lind, Jenny.

Joan of Arc.

Marlowe, Julia.

Marie Antoinette.

Maria Theresa.

Nightingale, Florence.

Ossoli, Margaret Fuller.

Patti, Mme.

Pocahontas.

Roland, Mme.

Sappho.

Stael, Mme. de.

Stowe, Harriet B.

Victoria, Queen.

Victoria, Queen.

Ward, Mrs. Humphry.

Washington, Martha.

Wilhelmina, Queen.

Wilkins, Mary.

Willard, Frances E.

QUESTIONS.

How old was Queen Victoria when she ascended the throne? How many years did she reign? When and at what age did she die?

At what age did Wilhelmina become queen of the Netherlands?

In what field of labor did Frances Willard become world famous? Where was she born? Educated?

Was Emma Hart Willard, who wrote "Rocked in the Cradle of the Deep," related to Frances Willard?

What are some of the principal productions from the pen of Mrs. Humphry Ward?

What was George Eliot's real name? In what story does she portray her girlish personality? At what age did she marry?

What names have made the reign of Elizabeth one of the most famous literary periods of all time?

What national association was organized by Susan B. Anthony? Who worked with her in this movement?

What painting by Rosa Bonheur was purchased for \$55,000 by Cornelius Vanderbilt?

Of what descent is Sarah Bernhardt? By whose wish was she baptized into the Christian faith?

In what year did Louisa M. Alcott write her famous "Little Women"?

What poem by Elizabeth Barrett led to her marriage to Robert Browning?

For what work is Jane Addams famous?

In what production did Maude Adams score a great success and win much of her present fame?

What famous hall was presented to a great university by Helen Gould?

For what are Alice and Phœbe Cary celebrated?

Who was Hypatia? What led to her brutal murder by the clergy?

When and where was Julia Marlowe born?

QUESTIONS—BIOGRAPHY.

ACTORS AND DRAMATISTS.

How is Henry Irving regarded as an actor?

Of what nationality is Ellen Terry? How does she rank as an actress?

In what world-famous play did Joseph Jefferson take the leading part?

How is he regarded by the American people? What is his rank as an actor?

In the presentation of what plays did Edwin Booth win fame?

What is the nationality of Bernhardt? For what lines of work is she noted other than acting?

What are the principal dramas of Shakespeare presented today?

ARTISTS.

How does Rosa Bonheur rank as an artist? When did she die?

What was the last and unfinished painting of Raphael?

Is Dante Rossetti more famous as a poet or painter?

How many paintings has Rubens produced?

What picture by Titian has been described as faultless?

What are Raphael's greatest works? Name three.

What is Vandyck's rank among portrait painters?

For what extraordinary sums were Rembrandt's "Coppenol" and "Jesus Before Pilate" sold?

What sculptor made the statue of "Liberty," overlooking New York harbor?

BUSINESS AND INDUSTRIAL.

Over what immense number of miles of railway was Jay Gould once in command?

What great sum was paid by Barnum for "Jumbo," the huge elephant?

Who is James J. Hill? What has he accomplished in his line of work?

What can you say of Alfred Krupp? For what is he noted?

What is the record of Marshall Field along commercial lines?

At what age did Rockefeller enter business and when did he become head of the Standard Oil Company?

DISCOVERERS AND EXPLORERS.

What famous search mission was undertaken at the suggestion and expense of James Gordon Bennett?

How did it happen that the new continent was named after Amerigo Vespucci?

Where did Andre start on his balloon expedition to the North Pole? What was the result?

In what cool way did Balboa appropriate the Pacific?

What were the education and the early tastes of Christopher Columbus?

Which was the most famous of Drake's voyages?

How was Vasca da Gama rewarded by the Portuguese government for being the first to round the Cape of Good Hope?

How did Livingstone and Stanley divide the field of discovery?

How much nearer the pole than any previous explorer did Nansen arrive?

What are the dates of Peary's three Arctic expeditions?

From what very humble origin did Livingstone make his way to fame?

Name some of the notable events in the career of Daniel Boone.

EDUCATIONAL.

What rank does William R. Harper take as an educator?

Along what lines is Booker T. Washington working in the education of the negro?

Of what subject was Frances Willard a professor in Northwestern University?

For what is Euclid noted? Sir Isaac Newton?

What was the original endowment fund of the Astor Library, and what is the size of the library?

For what is Leland Stanford's name noted?

How did Aristotle believe happiness is attained?

What was the great good in life and the great evil according to Epicurus?

For what is William T. Harris distinguished?

Of what famous university is Arthur T. Hadley the head?

Of what university is James B. Angell president?

What is the plan of the Carnegie Institution? Where is it located?

Who founded Harvard University and when?

Who was Horace Mann? Frances Parker?

What university has for its head E. Benjamin Andrews? David Starr Jordan? Woodrow Wilson? Edmund J. James? Cyrus Northrup? Jacob Gould Schurman?

HISTORICAL.

At what unusual age did George Bancroft enter college and receive his doctor's degree?

What were the various stages of emancipation?

From what social class was Washington descended and how long had his family been in America?

Where did Croesus obtain his proverbial wealth?

Who was Aurelius Antonius?

What was the career of Caius Marius?

What is the story of Romulus and Remus?

For what was Alfred the Great especially noted?

When did Kitchener leave Sudan?

What was the unusual combination of characteristics in Tiberius' reign?
Who were the parents of Frederick Douglass and what was his early mode of life?

What was the treaty which bears John Hay's name?

What was the far-reaching object of Lysurgus?

What repeated penalties did William Penn suffer for his Quaker opinions?

For what parliamentary acts was Sir Robert Peel celebrated?

What were the great events in Oliver Cromwell's life?

Who was Chinese Gordon or Gordon Pasha?

Who was Robin Hood and his followers?

What is the story of William Tell?

What Presidents of the United States have been assassinated?

INVENTORS.

Where was the first locomotive engine made in the United States and from whose plans was it constructed?

How is the story of Thomas Edison's life typically American?

What is the great invention of George Westinghouse?

What American ship famous in the Civil War was invented by Ericsson?
What effect did it have on naval warfare?

When did Howe invent the sewing machine?

What machine invented by Eli Whitney has been the means of the saving and making of millions of dollars every year?

Is Bell, the inventor of the telephone, still living?

Who is Marconi? What is his important discovery?

LITERATURE.

(For more extended list of writers and authors see LITERATURE.)

What is regarded as Victor Hugo's best novel?

Of what nationality is Tolstoi?

What is the nature of Mark Twain's writings?

Who is Jacob Riis? What are some of his best books?

With what paper was Joel Chandler Harris connected for more than twenty years?

Why is Edward Everett Hale called "the American Defoe"?

Of what nationality was Ibsen? Tell of his life and works.

For what humble trade did Whittier prepare himself?

RELIGIOUS.

At what early age did Moody begin his evangelical work?

In what capacity has Dr. Parkhurst earned his fame as a social reformer?

What life did Peter the Hermit lead after the Crusades?

For what is Robert Raikes noted?

With what university is Emil G. Hirsch connected? For what is he famous?

Who was John Huss? What noted article did he write?

What was the appearance and personality of Phillips Brooks?

Who protected Calvin after he had turned heretic to the Roman Catholic faith? How did the Calvinist sect arise?

From what circumstances arose the term "Quakers"?

What famous duel was made the subject of one of Lyman Beecher's most noted sermons?

Of what religion was Zoroaster the founder?

Of what famous educational assembly is Bishop Vincent the founder?
 Who was Savonarola?
 To what form of religion did Voltaire hold in denouncing Christianity?
 In what way was the Society of Jesuits formed?
 When did Leo XIII become pope and how many years was he at the head of the Roman Catholic church?
 For what is Bishop Ireland noted? Bishop Spalding? Cardinal Gibbons?
 What distinction did the Methodist Episcopal church bestow upon Francis Asbury?
 In what year did Dowie announce himself to be "Elijah the Restorer"?
 At the head of what great religious and charitable movement is William Booth?

MUSICIANS.

What rank does Jan Kubelik take as a violinist?
 From what common affliction did Handel and the poet Milton suffer?
 To what king was Mendelssohn appointed musical director?
 What honor was conferred upon Mozart at the age of six?
 What is Mme. Nordica's nationality? What is her rank as a singer?
 When was Sousa's band first organized?
 For what is Antonio Stradivari noted?
 Thomas was the musical director in what noted fair?
 From what did Wagner select his subjects?
 How is Chopin pronounced?

MILITARY AND NAVY.

In what war did Grant serve in every battle but one?
 In what tragic way did Montezuma bring death upon himself?
 What did General Grant owe to Richard Yates?
 Where was General Custer defeated and killed and what commemorates the spot?
 What part did Rear Admiral Schley play in the war with Spain?
 When did Dewey become an admiral?
 When did General Weyler leave Cuba?
 When did Funston capture Aguinaldo?
 Who is Captain Dreyfus? What persecutions has he been subjected to and why?
 Who commanded the Invincible Armada?
 In what famous battle were the Confederate forces successful under the leadership of Bragg?
 What Japanese leaders won fame in the Russo-Japanese war? What Russian leaders?
 In what lay Lee's wonderful military genius?

MISCELLANEOUS.

For what is Lyman Abbott noted?
 What is the Hall of Fame? Names of what noted Americans have been inscribed? What are the conditions imposed?
 Who is Luther Burbank? What is his particular line of work?
 How does Hull House rank in the institutions of its kind in the United States? Who is at its head?
 For what is Henry George noted? To what extent, if any, have his ideas been adopted?

Sir Christopher Wren restored what celebrated cathedral?
How did Chester A. Arthur serve in the Civil War?

PHILANTHROPISTS.

What is the wide range and importance of George Peabody's philanthropic work?

What famous simile did John Locke make in describing the human mind?

What enormous gifts of money have been donated by Carnegie and for what purposes?

What were some of the contributions of George Peabody in the cause of education? What is the Peabody Educational Fund?

What is the college founded by Stephen Girard to which ministers are denied entrance? Where is it located?

How many boys and girls were educated by George William Childs?

What generous aid did Cecil Rhodes give to the Irish Home Rule cause?

PHILOSOPHERS.

In what direction has Hegel's philosophy made itself most powerfully felt?

What was Plato's philosophy? Who were the Seven Wise Men?

What was Galileo's most important discovery? For what was he persecuted?

What system of philosophy did Auguste Comte found?

What was Socrates' method of arriving at the truth?

POLITICAL.

For what reason did McKinley receive more than the average vote of his party in 1896?

For what was Cleveland's second administration memorable?

At what very early period did Martin Van Buren enter political life?

How did James Garfield's unexpected nomination for the presidency come about?

In what dramatic episode was Henry M. Teller the leader?

Was Mark Hanna largely responsible for placing McKinley in the presidential chair?

How many years has Joseph G. Cannon served in Congress?

Of what party was John C. Breckenridge once the candidate for the presidency? What was his rank in the Confederate army?

How many times was Henry Clay defeated for the presidency? What is his famous saying in this connection?

When did Chauncey Depew retire from a railroad presidency?

Give an account of the public career of Theodore Roosevelt.

RULERS.

For what is Abdul Hamid noted?

For what reasons was Marie Antoinette unpopular with the French populace?

When was the title "Empress of India" conferred upon Queen Victoria?

Who is the present king of Denmark? Of Norway? Whom did the latter succeed?

Who was the father of Queen Christina of Sweden and who directed her unusually broad education?

Which of the Russian rulers named Ivan was called "The Terrible"?

Who was the greatest king of Scotland, and why?

Over what celebrated woman did Mary I triumph in ascending the throne?
 What is the meaning of "Hapsburg"?
 Who is the present ruler of Holland?
 Who was Queen Elizabeth's mother?
 Who is the sultan of Turkey? Tell of his relations with other countries.
 Why was George IV given the nickname of "First Gentleman of Europe"?
 What are the characteristics of the czar of Russia?

STATESMEN AND ORATORS.

In what two cabinets has Horace Porter served?
 When did John Sherman resign his position as secretary of state?
 Who was at the head of the war department during Lincoln's administration?
 What principle dominated Webster through all his political life?
 What was Gladstone's public career?
 How long was Lord Rosebery premier of England?
 Compare personal characteristics of Roosevelt and McKinley.
 How is John Hay regarded as a diplomat?
 Who was Paul Kruger? For what principles was he fighting? What were his characteristics?
 Who is Ito? What is he doing for his country? In what way has the United States helped him?
 What were the leading characteristics of Webster?
 What relation to Napoleon is Secretary of the Navy Bonaparte?
 Who is La Follette? For what work is he prominent?
 What speech resulted in the nomination of Bryan to the presidency in 1896?
 What were some of the characteristics of Beecher as a speaker?

PATRIOTIC.

In what way did Congress make recognition of LaFayette's services?
 What is the interesting memorial in honor of Kosciusko?
 Who was Robert Emmet? For what was he executed?
 What part in affairs of Colonial times did Patrick Henry take? What is his famous saying?
 For what was Joan of Arc noted?
 In what way did Florence Nightingale serve her country?
 Who was James Lawrence? When did he utter the famous words: "Don't give up the ship"?

SCIENTIFIC.

For what is Pasteur noted? Professor and Madam Curie?
 By whom was radium discovered?
 What is liquid air and its uses? Who has been the most successful experimenter with it?
 What are the principles on which the thermometer works? The barometer?
 Who invented each?
 Who is Hiram Maxim and for what is he noted?
 What deadly explosive was invented by Alfred Nobel? What are the Nobel prizes?

All that mankind has done, thought, or been
is lying as in magic preservation in the pages
of books.
—Carlyle.

Botany

To enable the student to use intelligently the systematic and classified index embodied in THE NEW PRACTICAL REFERENCE LIBRARY, we supply herewith an outline on BOTANY which includes only those titles actually reached by way of the title BOTANY. To make the matter clear: If a person reads the article on BOTANY he would be referred to the article on PLANTS. When he reads the article on PLANTS he will be referred to the articles on STEMS, LEAVES, FRUITS, etc. He may then return to the article BOTANY, and will find a cross reference to CLASSIFICATION. Under CLASSIFICATION he will find cross references to GENUS, SPECIES and VARIETY. When he has read these he will return to the article BOTANY, find articles on SLIME MOLDS, DIATOMS and BACTERIA. In the last named he will find references to PUTREFACTION, FERMENTATION, etc., with a reference which leads into MEDICINE. Running down the page to cross reference 14, you will note CONIFERÆ. Under this the several important cone-bearing trees are mentioned by name. Note that under PINE you will be led into the products of pine, which carries you into LUMBER and FORESTRY, where you might find still further cross references.

A systematic outline like this on BOTANY shows to the eye very clearly what a valuable and thorough-going index we have in our cross references and how very interesting, work of research may become by using THE NEW PRACTICAL REFERENCE LIBRARY.

BOTANY.

- | | |
|-------------------|----------------------------|
| 1. Plant | (d) Germ Theory of Disease |
| (a) Stems | (e) Medicine |
| (b) Leaves | 6. Molds |
| (c) Fruits | 7. Rusts |
| (d) Flowers | 8. Yeasts |
| (e) Pollen | 9. Algae |
| (f) Seeds | 10. Lichens |
| 2. Classification | 11. Mosses |
| (a) Genus | 12. Ferns |
| (b) Species | 13. Club Moss |
| (c) Variety | 14. Coniferae |
| 3. Slime Molds | (a) Cypress |
| 4. Diatom | (b) Fir |
| 5. Bacteria | (c) Hemlock |
| (a) Putrefaction | (d) Larch |
| (b) Fermentation | (e) Pine |
| (c) Antiseptics | (1) Tar |
| (1) Surgery | (2) Turpentine |

- (3) Forests
 - (a) Forestry
- (4) Lumber
 - (a) Saw
- (f) Sequoia
 - (1) Redwood
- (g) Spruce
- (h) Yew
- 15. Cycads
- 16. Grasses
- 17. Palms
 - (a) Cabbage Palm
 - (b) Coconut
 - (c) Date
 - (d) Doum Palm
 - (e) Ivory Palm
 - (f) Palmetto
 - (g) Palmyra Palm
 - (h) Sago
 - (i) Talipot Palm
- 18. Lily Family
- 19. Orchids
- 20. Cruciferae
 - (a) Mustard Family
- 21. Leguminosae (Pulse Family)
 - (a) Indigo
 - (b) Peanut
 - (c) Bean
 - (d) Cassia
 - (e) Acacia
 - (f) Clover
- 22. Labiatae (Mint Family)
- 23. Compositae
 - (a) Arnica
 - (b) Aster
 - (c) Chrysanthemum
 - (d) Dahlia
 - (e) Daisy
 - (f) Goldenrod
 - (g) Lettuce
 - (h) Tansy
 - (i) Thistle

flowers

- I. USES.
 - 1. Primary.
 - a. Produce seeds.
 - 2. Secondary.
 - a. Beautifying earth.
 - b. Commercial purposes.
- II. PARTS.
 - 1. Calyx.
 - 2. Corolla.
 - 3. Stamens.
 - a. Filament.
 - b. Anther.
 - c. Pollen.
 - 4. Pistils.
 - a. Ovules.
 - b. Stem-style.
 - c. Stigma.
- III. VARIATIONS.
 - 1. Construction.
 - 2. Forms.
 - 3. Colors.
- IV. CULTIVATION.
 - 1. Methods.
 - a. Landscape gardening.
 - b. Conservatories, hot houses.
 - c. Nurseries, etc.
- V. NATIONAL AND STATE FLOWERS.
 - 1. Significance.
 - a. Denote feelings and characteristics of nations.
 - b. Influence.
 - 2. Countries.
 - a. United States.
 - b. Foreign countries.
- VI. LANGUAGE OF FLOWERS.
- VII. COMMERCIAL.
 - 1. Manufacture of artificial flowers.
 - 2. Supplying markets with shrubs and flowers.
- VIII. COLORED PLATE.

QUESTIONS.

What is the great fact in the life of the flower?
 Why is it necessary that birds and insects should be attracted to the flowers?
 By what means are birds and insects so attracted?
 From the color plate illustrating flowers, how many varieties do you find common to your garden? To your nearest greenhouse?

Name and describe a dozen different kinds of flowers of your neighborhood.
 How many thousand species of orchids are known?
 Where do orchids grow wild in the forests?
 What are some of the peculiar shapes of orchids?
 What city leads in the manufacture of artificial flowers?
 Just from your everyday observation, for what would you say artificial flowers were most generally used?
 When and where did the Language of Flowers originate?
 What is your state flower?
 What is the calyx?
 Why is the corolla usually highly colored?
 Where do you find the pollen in the flower and of what use is it?
 From what country does the lotus come?
 What do the natives of India believe of the lotus?
 What flower is the emblem of Persia?
 What country has the fleur de lis for a national flower?
 What is the national flower of the United States? How and when was it selected?
 What flower often assumes the forms of reptiles and insects?
 From what flower do we get the vanilla?
 What flower is the emblem of Japan?
 How are the state flowers adopted?
 What is the state flower of West Virginia? Of Louisiana? Of Indiana?
 Of New York? Of Kansas?
 What species of the chrysanthemum are common weeds in Britain?
 Of what was the daisy the emblem in the days of chivalry?
 What is the universal significance of the forget-me-not?
 What is the popular name of geranium?
 What ancient people sent holly with New Year's gifts as emblems of good will?
 Where has ivy been held sacred?
 Narcissus, according to the Greeks, was changed into what flower?
 What kind of plant is the sun dew?
 Of what was the myrtle an emblem at Athens?

QUESTIONS—BOTANY.

Who is the Father of Botany?
 In what way did Darwin's theories and discoveries revolutionize botany?
 Of what plant in particular did he make a study?
 What is pollen? Why is it produced in such abundance? How do insects help in the fertilization of flowers?
 What are some of the methods by which seeds are scattered? Why are they produced in such abundance?
 What are parasites in the plant world? Give examples.
 Give uses of the following to plant life and describe their functions: Roots, stems, leaves, flowers.
 What instrument aids materially in the study of botany?
 Why are leaves arranged on a plant in a certain order and always to what end?
 What is chlorophyll? What important work does it do for the plant? What is meant by saying plants take in carbonic acid gas and give off oxygen?
 What is meant by germination? Upon what does it depend?

How many different species of palms are there? What are their main characteristics? Name three well-known varieties.

What is the meaning of the word "coniferæ"? Describe the general characteristics of the pine family.

What foods are produced by the leguminosæ order?

What common vegetables are produced by the mustard family or cruciferæ?

Of what aid are bacteria to plant life? What injury?

Where are lichens found in greatest variety? What is their chief use? Describe their growth.

What are fungi? Characteristics? Number of species?

How many known species in the family compositæ? Of what do they consist?

What are the principal uses of moss? Where grown?

Why are orchids favorite plants? Where are they found?

How do the following injure the plant: Molds, rusts, fungi, etc.?

What are cotyledons? Dicotyledons? Monocotyledons?

What is known of the diseases of plants? What havoc do insects and worms play in the plant world?

Perhaps you are excusing yourself for not buying books on "the insufficiency of your income." But do you not spend for other things, entirely unnecessary, much more every year than the cost of a few books? The immediate outlay need not be large; the returns which you will realize will be great in proportion to your good judgment and earnestness. Not only will the possession of a good library add to your enjoyment and increase your capacity for doing good; it may, if you are worldly minded—and we all are—put you in the way of occupying a more desirable position and earning a more satisfactory reward for your labors.

—James Baldwin.

Chemistry

That we should have at least a practical knowledge of the elements necessary to life, the air we breathe, the food we eat, will go unquestioned. An elementary knowledge of chemistry is of prime importance to the housewife, to the farmer, and the layman in every walk of life. The science of chemistry enters into every branch of study.

The boy with an active mind has inquired the cause of cream forming on milk; he wonders what causes gas to burn: smoke to rise? water to freeze: how matches are made; in fact he is daily confronted with subjects on which his mind hungers for enlightenment. He should have means of appeasing and at the same time developing this natural appetite. To form the habit of looking up daily such subjects will lay a permanent foundation to a broad, practical education.

In the preparation of THE NEW PRACTICAL REFERENCE LIBRARY this idea was constantly kept in mind, and throughout the work will be found an inexhaustible fund of such information, written in simple, clear language. In the accompanying outline no effort has been made to go into detail. A brief list of related subjects is appended. The student will find hundreds of others. It must be borne in mind that the value of this course of study, as any other, lies in the fact that the user is led to search for the knowledge sought and is only rewarded when honest effort has been made.

CHEMISTRY.

What is chemistry? Of what does it treat?

HISTORY.

Alchemy (which see).

Objects.

Prolongation of life.

Transforming baser metals into gold.

Egypt.

Arabia.

Europe.

Results.

Paracelsus—Discovered preparation of drugs.

Lavoisier

Priestly

Scheele

} By use of balances established modern ideas of chemistry.

GREAT CHEMISTS (which see).

Sir Humphrey Davy

Berzelius

Bacon

Boyle

Faraday

Gay-Lussac

Lavoisier

Liebig

Pasteur

Priestly

Others

Is chemistry an ancient or modern science?

What was alchemy? What were its two chief objects? What science did the study of alchemy develop?

In what ancient country is it thought the study of alchemy began?

What alchemist developed the manufacture of drugs, and when?

What other students of alchemy by the use of balances laid down the principal ideas of modern chemistry?

SUBSTANCE.

Element—Define.

Examples.

Aluminum. Copper.

Arsenic. Gold.

Calcium. Iron.

Carbon. Lead, etc.

Compound—Define.

Chemical affinity.

Atomic theory.

How many elements were known to chemistry in 1906?

What is the force called that holds elements together in the form of compounds? What other action does this force bring about?

What is an atom? A molecule? Is a drop of water an atom or a molecule? Why?

LAWS OF CHEMICAL COMBINATION.

Effects a change of

State. Volume.

Temperature. Taste.

Color. Smell.

Affected by

Heat. Electricity.

Light. Mechanical force.

When does chemical combination take place between molecules? Give an example.

Does chemical combination take place with different degrees of force in different bodies?

What is peculiar about the combination of all substances as regards weight and proportions?

How do gases combine?

NOMENCLATURE.

Endings applied to

Metals—

um.

Compounds—

ide. ous. ic. ite. ate.

To what do some elements in chemistry owe their names?

What is the modern custom of naming metals? Compounds? Give example.

Do the names of many compounds denote their composition? Give three examples.

When does the name of an element end in *ous*? In *ic*?

SYMBOLS.

Used to represent

Elements.

Compounds.

Chemical reaction.

BRANCHES OF CHEMISTRY.

Organic.	Industrial chemistry.
Inorganic.	Physical chemistry.
Agricultural.	Thermochemistry.
Electrochemistry.	

Some of the many related subjects are here listed. These will be found in

THE NEW PRACTICAL REFERENCE LIBRARY:

Hydrogen	Ice	Ozone	Paints	Soda	Coal-tar
Nitrogen	Zinc	Cobalt	Phosphorus	Oils	Dyeing
Oxygen	Gold	Nickel	Aluminum	Alum	Gums
Potassium	Silver	Sulphur	Tin	Acids	Resins
Water	Iron	Radium	Borax	Brass	

QUESTIONS—ELEMENTARY CHEMISTRY.

How do you account for carbonic acid gas being poisonous to the lungs but pleasant and stimulating to the stomach?

What is soda water? With what is it charged?

How is the cream on milk formed?

From the bark of what tree is quinine made? When was it discovered?

For what ailments is it helpful?

What is chloroform? When and by whom was it discovered? When and by whom was it first used as an anesthetic? How is it administered? What are its effects?

For what is ether extensively used?

Name some of the remarkable and valuable discoveries made by Sir Humphrey Davy.

What is ozone? Where does it exist? When is its odor noticed?

How is opium used in certain countries as an intoxicant? Under what name is it commonly used in medicine? Describe it in its natural state. From what country is the principal supply obtained? What beautiful flower in your own garden produces it?

What are some of the most common food adulterants? Name five?

How and from what is gunpowder made? What ancient people used it? When was it first used in war?

Does German silver contain any silver in its composition?

What is the difference between powder used for rifles and that used for blasting and for cannon?

What is smokeless powder? Who discovered dynamite? Nitroglycerin? Guncotton? Which has the greater explosive power, nitroglycerin or dynamite?

What is sulphur? Is it a vegetable or mineral? Where is it found? What are its principal uses? What useful and necessary little article is made from it and used in your home daily?

When were matches first used? How were they lighted?

How can you detect the presence of ammonia and alum in baking powder?

What part of air is oxygen? Nitrogen? Do these gases unite?

NOTE.—How large is an atom? Lord Kelvin says: "If we raise a drop of water to the size of the earth and raise the atom in the same proportion, then it will be some place between the size of a marble and a cricket ball." John A. Brashear in an address delivered at Lehigh University not long ago added: "If you fill a tiny vessel one centimeter cube (smaller than a thimble) with hydrogen corpuscles, you can place therein, in round numbers, five hundred and twenty-five octillions (525,000,000,000,000,000,000,000,000) of them. If these corpuscles are allowed to run out of the vessel at the rate of 1,000 per second it will require seventeen quintillions (17,000,000,000,000,000) of years to empty it.

What is the atmospheric pressure in tons on the human body of average size? How is this enormous pressure counterbalanced?

Why is milk one of man's most perfect foods?

In the manufacture of illuminating gas, what impurities must be removed? How is coal gas made? Water gas?

How many gallons of vinegar can be made from a bushel of corn?

Oxygen

DISTRIBUTION.

- a. In water.
- b. In air.
- c. In silica.
- d. In chalk.

ESSENTIALS.

- a. To rocks.
- b. To minerals.
- c. To tissues.
- d. To blood.
- e. To light.
- f. To heat.

PECULIARITIES.

- Odorless.
- Invisible.
- Tasteless.
- Least refractive.
- Most magnetic.

TEST QUESTIONS ON OXYGEN.

When and by whom was oxygen first discovered?

When and how was it first liquefied? Solidified?

How much heavier is oxygen than air?

Is oxygen necessary to all processes of respiration?

Without its presence would animal matter, after death, disintegrate?

How is oxygen distributed through the body? Describe the process in detail.

How do trees and plants give off oxygen?

In what other form, and by what name, does it exist?

How is it administered as a medicine?

What per cent of oxygen is found in air? Water?

Would death result if the supply of oxygen ceased?

Give three instances in everyday life where we come in practical touch with oxygen.

A pure, fresh book for a little child is a treasure to be sought for and appreciated.

A good book presented to a child on each succeeding birthday—a book chosen wisely with respect to the child's tastes and abilities, but of sterling worth, will soon put him in possession of a library which will be a lasting source of strength and satisfaction.

—Walter Taylor Field.

The habit of simply reading to be entertained is a habit that no one can afford to form.

Medicine

It must be apparent to every wide-awake person that an elementary knowledge of the properties of medicine and related subjects is essential to one's comfort and well-being. The general articles on MEDICINE and SURGERY give an interesting and instructive history of the development and present-day state of perfection of these important sciences. Besides, throughout THE NEW PRACTICAL REFERENCE LIBRARY will be found scores of interesting articles covering very generally this important field of study. To know the adaptability and wholesomeness of the food we eat is essential to good health and no less important is it to know the common, accepted laws of exercise and sanitation.

We have particularly aimed to give a clear description of the symptoms and causes of the commoner diseases known to young people, such as SCARLET FEVER, DIPHTHERIA, MEASLES, and brief mention is made of the latest accepted and recognized method of treatment. We particularly wish to call the reader's attention to the splendid articles found on "ANTIDOTE," "GERM THEORY OF DISEASE," "BACTERIA," "SANITARY SCIENCE," "ATHLETICS," "APPENDICITIS," "FOOD," etc.

QUESTIONS.

Of what is medicine a science? With what does it deal?

DIVISIONS.	SPECIAL DEPARTMENTS.	SYSTEMS OF TREATMENT.
Medicine proper.	Diseases of the skin.	Early times.
Surgery.	Diseases of the eye.	a. Ceremonies.
SUBDIVISIONS.	Diseases of the nose.	b. Prayers.
Hygiene.	Diseases of the insane.	Vegetable treatment.
Dietetics.	Diseases of children.	Hydrotherapy.
Pathology.	Military hygiene and science.	Osteopathy.
Nosology.	GENERAL CAUSES OF DISEASE.	Homeopathy.
Pathological anatomy.	Germ.	Allopathy.
THERAPEUTICS.	Resistance to healthy action.	
a. General.	Breaking down of tissues, etc.	
b. Special.		

What are the symptoms of diphtheria? Appendicitis? Scarlet fever?
Measles? Smallpox?

What is vaccine? Antitoxin?

What distinguishes the physician from the surgeon?

What were the early beliefs as to the causes of disease and what the treatment?

What school of medicine upheld the bath as a panacea for all human ills?

What is homeopathy? Osteopathy? The germ theory of disease?

Is your family physician an allopath or homeopath?

If you do not know, by what means can you tell when he next has occasion to administer medicine to you?

What is an antidote? Are there poisons for which there are no antidotes? What antidotes will counteract the effects of the following poisons: Arsenic? Carbolic acid? Carbonic acid gas? Chloral? Coal Gas? Cocaine? Lye? Matches? Morphine? Nicotine? Opium? Paris green? Strychnine? Tansy? Turpentine, etc.?

We give below a limited number of closely related articles which will be found under their proper titles in the LIBRARY. The reader must constantly keep in mind that subjects should be looked for under their most natural heading; for instance, "Arsenic" would not be described under "Poison" or "Medicine," but under its own title:

Homeopathy	Ether	Mosquito, Transmission
Dispensary	Osteopathy	of Disease
Health, Boards of	Ambulance	Hospital
Medicine	Sanitary Science	Insane Asylum
Hygiene	Anatomy	Disease
Nurse	Histology	Physiology
Inoculation	Apothecary	Surgery
Antidote	Antitoxin	Vaccination
Diphtheria	Germ Theory of Disease	Hydrotherapy
Smallpox	Appendicitis	Dietetics
Mumps	Scarlet Fever	Consumption
Food	Bandage	Measles
Cancer	Poison	Allopathy
Athletics	Gymnastics	Yellow Fever
Chloroform	Influenza	Typhoid Fever
	Adulteration	

If a genius like Gladstone carried through life a book in his pocket, lest an unexpected spare moment slip from his grasp, what should we of common abilities not resort to to save the precious moments from oblivion?

Believe me when I tell you that thrift of time will repay you in after life with a usury of profit beyond your most sanguine dreams, and that waste of it will make you dwindle alike in intellectual and moral stature beyond your darkest reckoning. —Gladstone.

What is put into the first of life is put into
the whole life. Start right. —Colton.

Civil Government

Few subjects are of greater importance to the boys and girls than a correct understanding of the workings of our governmental machinery.

This subject should be developed from the immediate district or township and a thorough understanding of the primary principles will do much toward an understanding of the subject as applied to nations.

In classes of sufficient size, ideas of government can be practically illustrated by organizing them into caucuses, conventions, courts, etc., by holding elections, creating offices and showing the pupils how to perform the duties thereof.

The schools have given far too little attention to this important subject. Many of the political evils so prevalent are largely due to the fact that Civics is not taught until in the high school or college.

The only way to respect and love the Constitution is to *know* it. Citizens should know the obligations imposed upon them. Electors should realize the importance of their vote; taxpayers should comprehend the use made of their money, and all should be taught to love our country and her laws.

If ideas of true citizenship be early taught and the children are led to appreciate the inestimable birthright of American citizenship, patriotism will be fostered, political corruption checked and wise government well founded.

Constitution

- I. DEFINITION—Supreme law of the land.
- II. FORMATION.
 - 1. Time—September 17, 1787.
 - 2. Place—Philadelphia.
 - 3. Manner—By Federal Convention.
 - 4. Difficulties—Compromise between Hamilton and Jefferson.
- III. EFFICIENCY—Compared with Articles of Confederation.
 - 1. The central government had more power.
 - 2. The powers and functions were more widely distributed—legislative, executive and judicial.
- IV. PURPOSES.
 - 1. To form a more perfect union.
 - 2. To establish justice.

This outline is developed from the Constitution of the United States. You will find articles on the various subjects in THE NEW PRACTICAL REFERENCE LIBRARY, but since every one has access to the Constitution it has not been thought advisable to give it space in the LIBRARY.

3. To insure domestic tranquillity.
4. To provide for the common defense.
5. To promote the general welfare.
6. To secure the blessings of liberty to the people.

House of Representatives

- I. MEMBERS.
 1. Number—determined by Congress.
 2. Term of office—two years.
 3. Election—by the voters or electors.
(What is the qualification of electors?)
 4. Qualifications.
 - a. Age.
 - b. Citizenship.
 - c. Residence.
 - d. Official disencumbrance.
 5. Apportionment.
 - a. According to population by census.
 - b. Conditional—may be reduced if the right to vote is abridged.
 6. Vacancies—filled by election.
- II. HOUSE POWERS.
 1. Elective.
 - a. House officers.
 - b. President of United States.
 2. Inquisitorial—originates impeachments.
 3. Legislative.
 - a. Exclusive—has sole power of originating bills for raising revenue.
 - b. Concurrent—coördinate with the Senate in general legislation.

Senate

- I. MEMBERS.
 1. Number—two from each state.
 2. Term of office—six years.
 3. Election—by state legislature.
 4. Classes.
 5. Vacancies.
 6. Qualifications.
 - a. Age.
 - b. Citizenship.
 - c. Residence.
 - d. Loyalty.
 - e. Official disencumbrance.
 7. Presiding officer—decides questions of order.
 - a. Vice President of United States.
- II. SENATE POWERS.
 1. Elective.
 - a. Vice President.
 - b. President pro tempore.
 - c. Senate officers.
 2. Judicial.
 - a. Number necessary to convict—two-thirds present.
 - b. Judgment in impeachment.

3. Legislative.
 4. Executive.
 - a. In making appointments.
 - b. In making treaties.
- III. ELECTIONS.
1. Legislatures of states.
 2. Congress may regulate except as to place of choosing.
- IV. MEETING.
1. Frequency—at least once each year.
 2. Time.
 - a. By the constitution, first Monday in December.
 - b. By law Congress may appoint a different day.
 - c. President may call extra sessions.

Provisions Common to Both Houses

- I. MEMBERSHIP.
1. Each house judges elections, returns, and qualifications of its own members.
 2. Election must be legal, the returns valid and the person must be qualified.
- II. QUORUM.
1. Number—a majority of each house.
- III. BUSINESS RULES.
1. Each house may determine its own rules.
- IV. PENALTIES.
1. Punishment—for disorderly conduct.
 2. Expulsion—by two-thirds vote.
- V. JOURNAL.
1. Kept by each house.
 2. Publication.
- VI. YEAS AND NAYS.
1. Entering.
 2. Manner of taking.
 3. Objects.
- VII. ADJOURNMENT.
- VIII. SALARIES.
1. Amount.
 2. How paid.
- IX. OFFICIAL RIGHTS—FREEDOM.
1. From arrest.
 2. Of speech.
- X. PROHIBITIONS ON MEMBERS—TO PREVENT CORRUPTION.
- XI. OFFICIAL OATH.

Powers of Congress

- I. EXPRESS POWERS.
1. To lay and collect taxes.
 2. To borrow money on credit of United States.
 3. To regulate commerce.
 4. To establish a uniform rule of naturalization.
 5. To establish uniform laws of bankruptcy.

6. To coin money and regulate the value.
7. To fix the standards of weights and measures.
8. To provide for punishment of counterfeiting.
9. To establish postoffices and post roads.
10. To grant patents and copyrights.
11. To establish inferior United States courts.
12. To have charge of matters related to war.
13. To exercise control over United States territory.
- II. IMPLIED AND INCIDENTAL POWERS.
 1. To purchase foreign territory.
 2. To establish military and naval academies.
 3. To make internal improvements.
 4. To create corporations.
 5. To make all laws necessary to carry into effect all powers.
- III. POWERS PROHIBITED AND RESTRICTED.
 1. To suspend the writ of habeas corpus.
 2. To pass a bill of attainder.
 3. To pass an ex post facto law.
 4. To lay direct taxes unless in proportion to the census.
 5. To lay taxes on state exports.
 6. To give preference to the ports of one state over another.
 7. To compel vessels to enter any port other than the one bound for.
 8. To draw money from treasury without lawful appropriations being made.
 9. To grant titles of nobility.
 10. To abridge freedom of speech or of the press.
 11. To establish religion or prohibit its exercise.
 12. To deny the right of assembling to petition the government.
 13. To repudiate debts.

Executive

- I. NECESSITY AND OBJECT—TO EXECUTE THE LAWS.
- II. TERM OF OFFICE.
- III. ELECTION.
 1. By electors.
 2. By House of Representatives.
- IV. QUALIFICATIONS—GIVE A REASON FOR EACH.
 1. Birth.
 2. Age.
 3. Residence.
- V. VACANCY IN OFFICE OF PRESIDENT.
- VI. SALARY—FIXED BY CONGRESS.
 1. Payment—monthly.
 2. Amount.
- VII. OATH OF OFFICE.
- VIII. POWERS AND DUTIES.
 1. Commander-in-chief of the army and navy.
 2. Commander-in-chief of the militia when in actual service.
 3. By and with the advice and consent of the Senate he may appoint many government officials.
 4. Fill vacancies occurring during recess of Senate.
 5. Grant reprieves and pardons except in cases of impeachment.

6. With the concurrence of the Senate make treaties.
 7. Convene either or both houses of Congress if occasion so demands.
 8. Recommend such measures to Congress as he shall judge expedient.
 9. Receive ambassadors and public ministers.
 10. Take care that the laws are faithfully executed.
 11. Commission all officers of the United States.
- IX. REMOVAL FROM OFFICE.

The Cabinet Officers

- I. APPOINTED BY PRESIDENT WITH ADVICE AND CONSENT OF SENATE.
- II. SALARY.
- III. MEMBERS.
 1. Secretary of State.
 - a. Has charge of foreign and domestic relations.
 2. Secretary of Treasury.
 - a. Collects and disburses public money.
 3. Secretary of War.
 - a. Directs the army and military matters.
 4. Secretary of Navy.
 - a. Controls the navy and naval affairs.
 5. Secretary of Interior.
 - a. Manages public lands, education, indians, pensions and patents.
 6. Postmaster-General.
 - a. Has charge of transmitting and distributing mail matter.
 7. Attorney-General.
 - a. Has charge of the legal department.
 8. Secretary of Agriculture.
 - a. Has charge of the agricultural reports and development.
 9. Secretary of Commerce and Labor.
 - a. Has charge of corporations and manufactures, census bureau, immigration, etc.

Judicial Department

- I. OBJECTS—TO INTERPRET AND APPLY THE LAWS.
- II. IN WHAT VESTED?
 1. Supreme Court.
 - a. Members—Chief Justice and eight Associate Justices.
 - b. Session—where and when?
 2. Inferior Courts—established by Congress.
 - a. Circuit courts—number?
 - b. District courts—number?
- III. JUDGES.
 1. How chosen?
 2. Oath of office?
 3. Term of office?
 4. Number?
 5. Salaries?
 6. Removals?
 7. Provisions for retirement?
- IV. OFFICERS.

- V. JURISDICTION.
- VI. TRIALS.
 - 1. Civil cases.
 - 2. Criminal cases.
- VII. TREASON.

QUESTIONS ON CIVIL GOVERNMENT.

- What state has been annexed? (Texas.)
- What state had no territorial government before admission? (California.)
- Define constitution. Law.
- Is a constitution necessarily a written instrument?
- Give a distinction between the two kinds of constitutions.
- What is the greatest example of a constitution combining and limiting the various departments of government?
- What is the object of government?
- Name the most common kinds of government.
- Where does the government get its power?
- What is peculiar of our own form of government?
- Name three kinds of colonial governments.
- What is the supreme power in the British system of government?
- Give an important distinction between the constitution of the United States and the constitution of the states of the Union.
- What party was founded on the platform "The constitution of the country, the union of the states and the enforcement of the laws?"
- Why did the colonies refuse to be taxed?
- What did the first Continental Congress do?
- What represented the central government during the Revolution?
- Explain the defects in the Articles of Confederation that made the central government weak.
- When was the constitution formed? When adopted?
- Name the three departments of our government.
- What was the Conway Cabal?
- What were the Articles of Confederation?
- In what is the law-making power vested?
- How are representatives chosen?
- How is the number of representatives determined? How chosen?
- How are the members of the lower house of the state legislature chosen?
- What are the qualifications of representatives?
- Can a congressman hold any other civil office?
- In what years is the census taken?
- Are territories allowed representatives in Congress?
- How are vacancies in the House filled?
- Who is the present speaker in the House?
- How are senators chosen? Number and term of office?

CIVIL GOVERNMENT.

NOTE.—Let every American, every lover of liberty, ever well-wisher to posterity, pledge his life, his property and his sacred honor to the support of the Constitution and the laws. —*Abraham Lincoln.*

"Without civic and political education the sovereign people is a child playing with fire, at the risk each moment of burning down the house." —*Pestalozzi.*

Who is president of the Senate? Can he vote? What are the other officers?

What judicial power has the Senate?

Who presides over the Senate when the President is impeached? Why?

What power has Congress concerning elections?

When are representatives elected?

When does Congress meet?

Who makes the final decision as to who are entitled to a seat in either house of Congress?

What constitutes a quorum?

Can absent members be compelled to attend?

What is the power of each house in regard to rules, order, etc.?

What is the rule of adjournment? What was the object of this rule?

Where do senators and representatives get their pay? How much?

Can congressmen be arrested? When? Can suit be brought against them for language used in debate? Why?

Can congressmen fill lucrative offices which have been created during the time for which they were elected?

Can a congressman hold any office under the United States at the same time he is a congressman?

Where do bills for revenue (levying taxes) originate?

Name the general powers of congress.

What prohibitions does the constitution place upon the states?

What are United States bonds?

Can Chinese become citizens of the United States? Why?

What is money? Who fixes the standard of weights and measures?

What is counterfeiting?

How are copyrights obtained? Patents?

Who establishes inferior courts of the United States?

What is piracy? What are letters of marque and reprisal?

What is the limit of appropriations for war?

Of what use is the navy?

What is the difference between the militia and the regular army?

What is an express power? Incidental or implied power?

Name four incidental powers of Congress.

What provisions were made by the constitution concerning slavery?

Define habeas corpus. When has the writ of habeas corpus been suspended? Why? Who has the power to suspend it?

What is a bill of attainder?

What is an ex post facto law?

How must direct taxes be apportioned by the general government?

Why should states be prohibited from forming treaties?

Can a state pass any law impairing the obligation of contracts?

In what is the executive power vested?

Describe the manner of electing the President. What must be his qualifications?

What is the presidential succession law of 1886?

What is the salary of the President?

What oath does the President take?

How can the President be removed from office?

How does the President make appointments?

What is meant by "civil service reform?"

What is the President's message?

In what is the judicial power vested?
 What inferior United States courts have been established?
 Of how many justices does the Supreme Court consist?
 How many circuit judges are there?
 Can district courts cross state lines?
 What is meant by original and appellate jurisdiction?
 Who are the citizens of the United States?
 Can a person be tried twice for the same crime?
 Can private property be taken for public use?
 What is treason? What is necessary to convict?
 What is the punishment for treason?
 Name some of the rights of states.
 What is extradition?
 What was the "Ordinance of 1787?"
 Can the United States acquire territory? How?
 What is the relation of a territory to the Union?
 Is a state compelled to remain a state?
 How was Texas admitted?
 What was the condition of the seceded states after the Civil War?
 What question did the Civil War settle?
 How may amendments be proposed? Ratified?
 When does an amendment become valid?
 What is the supreme law of the land?
 Can a state nullify the laws of the Union?
 How was the constitution ratified?
 What state was the last one to ratify it?
 How many amendments have been made to the constitution?
 What is the nature of the first ten amendments?
 How many states has the Union? Territories?
 How did the United States get all its present territory?
 What is gerrymandering?

There is no department of educational work in which the difference between skilled and unskilled teaching is so manifest as in the view which is taken of the faculty of memory, the mode of training it and the uses to which different teachers seek to put it.

—Fitch.

The best work a student does is that
which teaches him the love of work and study.
—*Bishop Spalding.*

Common Subjects

We feel that our EDUCATOR would not be complete unless mention was made of what, from lack of a more suggestive name, we term "COMMON SUBJECTS." The work along this line in THE NEW PRACTICAL REFERENCE LIBRARY is indeed complete and interesting. From the primary up through the different grades the teacher and student is face to face with a thousand and one articles both at home and in school the elements and preparation of which he is in all but absolute ignorance; especially is this true of the processes of manufacture, sources of material, etc.

Take, for instance, the new and oftentimes startling uses to which the by-products of an industry are put: the making of buttons from blood, the conversion of rags, straw, etc., into paper, the manufacture of glass, celluloid, combs, needles, pins, etc.; the utilizing of the bones, hair, hoofs, etc., of animals into everyday articles, the use of which is perfectly familiar to the student, though of the source or methods of manufacture he has not the remotest idea. It gives us a sense of satisfaction to know that the teacher, student or general reader whenever occasion arises may consult THE NEW PRACTICAL REFERENCE LIBRARY on the subject in mind and invariably find a complete and interesting treatment of same.

We cite you to our outlines below in which a number of these subjects are treated, indicating the manner of handling others.

Meat Packing

U. S. GOVERNMENT INSPECTION.		BY-PRODUCTS.	PROCESSES.
Requirements.		Horns.	Transporting stock.
How enforced.		Hoofs.	Unloading.
When effective.		Combs.	Killing.
Results.		Buttons.	Dressing.
REFRIGERATION.		Knife handles.	Cooling.
Railroads.		Glue.	PRODUCTS.
Steamships.		Soap.	Fresh meats.
CENTERS.		Oils.	Salt meats.
Name four.		Hair.	Smoked meats.
1.		Wool.	Lard.
2.		Bristles.	Tallow.
3.		Hides.	Canned beef.
4.		Blood, etc.	Sausage, etc.

QUESTIONS.

How many hogs are slaughtered every minute in the Chicago packing houses?

Are cattle given any rest after reaching the stockyards before being slaughtered?

How long does it take to cool pork in the cooling room? Beeves? What is the temperature?

What is done to make the meat more tender?

What are the leading packing centers of the country?

Of what does the late government meat inspection consist?

What is an abattoir?

How many minutes does it require to kill and dress a hog? A steer?

How is fresh meat shipped from Chicago or other packing centers to European cities?

What is the value of hogs' bristles exported each year?

How many million cattle are slaughtered in the United States every year?

How many sheep? Hogs?

Paper

HISTORY.	MANUFACTURING MATERIALS.	USES.
Origin.		Name five.
China.	Vegetable fiber.	1.
First use.	Silk.	2.
Europe.	Wool.	3.
England.	Linen rags.	4.
United States.	Cotton rags.	5.
	Wood pulp.	KINDS.
	Wheat straw.	Linen.
	Corn husks.	Manila.
	Hemp ropes.	Japanese.
		Indian.

QUESTIONS.

From what does paper take its name? Why?

To whom is credit given for the discovery of paper-making?

How many centuries before Christ was the art known?

Name three of the most important and valuable uses to which paper is put.

Why your answer?

When and where was the first paper mill in the United States started? How does the United States now rank in its manufacture?

From what is the paper of the newspapers made? The paper of your writing tablet?

Describe in detail how rags are made into paper. What does the pulp resemble?

Describe the various sections and functions of a modern paper-making machine.

How is the water-mark made?

What is the best quality of paper? For what is it largely used? What paper is hand-made?

Glass

I. KINDS.	II. HISTORY.	III. MANUFACTURE AND INGREDIENTS.	IV. SHAPING.
Plate.	Egypt.		Blowing.
Flint.	Greece.		Bottles.
Crown.	England.	Fuel.	Vases.
Cut.	United States.	Furnace.	Window glass.
Colored.		Shape.	Pressing.
See color plate.		Capacity	Table-ware.
Stained.		Pots:	Casting.
		Sand.	Plate glass.
		Soda.	
		Lime.	
		Potash.	
			V. COLOR PLATE.

QUESTIONS.

- What is glass? When was the discovery made?
 In what country were specimens of glass discovered made as early as 2000 B. C.?
- Did the ancient Greeks know the art of artistic glass-making?
 How is window glass made? How cut? How flattened?
 How are bottles made? Glass fruit jars?
 How is cut glass made? What makes it so expensive?
 How is stained glass made?
 When and where was glass first used for windows?
 What fuel is used in the furnace in making glass?
 Why should the raw materials be pure?
 How is coloring in glass introduced?
 When was the manufacture of glass first introduced in the United States?
 What are the leading countries in the manufacture of glass?
 What tools does a glass-blower use?
 To what is due the softness and brilliancy of plate glass?
 Why are glass factories most numerous in the gas belts of the country?
 How many pounds of melted glass does the blower gather at the end of his pipe? How does he make it long?
 How is lettering placed on bottles?

Camphor

- I. DESCRIPTION.
1. What is camphor?
 2. What tree produces it?
 3. Product of what countries?
 4. Prepared chiefly in what island?
 5. What is the height of the Borneo camphor tree?
 6. What other plants yield it?
- II. USES.
1. As a stimulant.
 - a. Internal.
 - b. External
 2. As a poison.
 3. As a preservative.

Banana

I. STEM.

1. What is the height of the plant?
2. How is the stem formed?

II. LEAVES.

1. How many feet long are the leaves? How many wide? Used for what?
2. Ribs.
3. Veins.

III. FLOWERS.

1. How long do the spikes of the flowers grow?
2. Do the flowers blossom with their faces toward the ground or upward?

IV. FRUIT.

1. Which way does the fruit turn?
2. How many pounds does a bunch of bananas weigh?
3. What countries ship enormous quantities of the fruit to the United States?
4. How is a bunch of bananas hung in the fruit store?

Brick

I. MANUFACTURE.

1. Material used.
2. Process of making.
3. Brick-making of early times.

II. VARIETIES.

1. Pressed brick.
2. Fire brick.
3. Pavement brick or vitrified brick.
4. Hollow tiles.

III. SIZE OF BRICK.

1. Length.
2. Width.
3. Thickness.

IV. USES OF BRICK.

1. Buildings.
2. Foundations.
3. Sewers.
4. Cisterns.
5. Pavements, etc.

CORRELATED SUBJECTS: Brick-Laying; Clay; Tile.

QUESTIONS.

How many kinds are found in your neighborhood? Name them.
Of what is brick made? In what way are bricks dried?
In what ancient countries have sun-dried bricks been found?
Why are some of these bricks of great historic value?
By whom was the art of brick-making introduced into England?
What kind of clay should be selected for the making of brick? What proportion of sand should it contain? Why is this necessary? How are bricks cut?
Why are some bricks re-pressed?
How many bricks will a good machine make in a day?
Describe a brick-kiln. What is meant by "firing?" How many days does this require?
Where are brickyards found?
Where are the greatest centers of the brick industry in the United States?
How many bricks does our country produce a year?
What is the value of this product?
Which variety of brick outnumbers all other styles?
What is pressed brick? Why is fire brick so called?

Why does pavement brick contain lime? Why is it sometimes called vitrified brick?

Why are bricks extensively used for building? For what other purposes are they used?

How are hollow tiles used?

Dress

I. DEFINITION.

1. General meaning.
2. Special meaning.

II. ANCIENT.

1. Egypt.
 - a. Style.
 - b. Articles.
 - c. Materials.
2. Assyria.
 - a. Style.
 - b. Materials.
 - c. Trimmings.
3. Greeks.
 - a. Style.
 - b. Articles.
 - Chiton.
 - Peplos.

IV. EUROPEAN NATIONS.

1. Middle Ages.
 - a. Men.
 - Cloaks.
 - Other articles.
 - Armor. Why?
 - b. Women.
 - Articles.
 - Style.
2. Close of Middle Ages.
 - a. What radical changes in style?
 - b. Men.
 - Garments cut how? How many? What materials?
 - c. Women.
 - Garments, styles, etc.
3. Sixteenth to Eighteenth Centuries.
 - a. Excessive extravagance.
 - Leaders of fashion.
 - How extravagant?
4. Nineteenth to Twentieth Century.
 - a. Modern fashions.
 - Follow style of what age?
 - What articles worn?
 - Fashions governed by whom?
 - How vary from year to year?

V. BARBAROUS NATIONS.

1. American Indian.
2. Eskimo.
3. Negro tribes of Africa.

III. EASTERN NATIONS.

1. Chinese.
 - a. Any change from ancient?
 - b. Dress accords with what?
 - c. Laborers dress how?
 - d. People of rank dress how?
 - e. Garments. Men? Women?
2. Japan.
 - a. Style.
 - b. Garments worn.
 - c. European dress.
3. India.
 - a. Style.
 - b. Materials.

QUESTIONS.

Judging from colored plates, what would be your objection to ancient apparel? In what ways does it recommend itself?

In what ways is the modern dress of men superior to the ancient?

Were the men of ancient times handicapped by such apparel? Give reason for your answer.

Did the garment in ancient days depend in any way upon the work performed? Does it in modern times?

What is the costume known as the Louis XIV style? Did men and women in the United States ever follow this style? If so, when and where?

What is the dress of the American Indian? Eskimo? Highland Scot?

Tell what the following are and when worn and by what sex, what nation: Chiton, himation, peplos, toga, tunic, doublet, etc.

What quality of materials is worn by Chinese and Japanese of rank?

Who were the first people to fit the clothing?

What nations can be said to have worn classic styles?

Observing the colored plates, compare the styles of the German and English ladies of the seventeenth century. Which is the more substantial and serviceable?

Judging from the colored plates I and II, what is the chief difference in cut of garments of ancient and of modern times? Which is the simpler? Can each style be designated as extreme in character?

Athletics has a tendency to create what styles in dress?

What is known as the colonial style of dress in the United States?

The styles of United States as a general rule follow those of what country?

What purposes does dress serve?

What are the principal cities of fashion in United States? In Europe? What nation of Europe leads in styles of dress?

Cloths and Clothing

I. MATERIALS—RAW.

- | | | | | |
|----------|------------|----------|------------|-----------------------|
| 1. Silk. | 3. Cotton. | 5. Flax. | 7. Hides. | 9. Feathers. |
| 2. Wool. | 4. Fur. | 6. Hemp. | 8. Rubber. | 10. Bone, Pearl, etc. |

II. PREPARATION.

1. Raw Articles.
 - a. Where and how obtained.
 - b. Rough processes for local markets.
2. Manufacture.
 - a. Methods—spinning, weaving, dyeing, tanning, etc.
 - b. Placing product on world's markets.

III. FACTORIES.

1. Location.
2. Product.
 - a. Cloths—All colors, weaves, qualities, quantities of silk, woolen, linen, cotton, etc.
 - b. Clothing—Ready-made wearing apparel of fur, leather, cotton, silk and woolen goods, feathers, rubber, linen, bone, pearl, etc.

IV. MARKETS.

1. Wholesale.
2. Retail.

QUESTIONS.

- Possibly that red button on your coat was made of blood; tell about it.
How can you tell linen towels from cotton ones?
What can you find in your home made of hemp? Flax? Hides?
Compare your fine new shoes with those worn a hundred years ago.
What do we mean by worsted goods? "All wool?" What is mixed goods?
Of what materials can lace be made?
What is celluloid? What have you in your home made of it?
Give different articles of clothing made of leather.
Which would you rather have, a silk or a calico dress? Why?
What do you think governs the price of cloth?
Why did a cotton famine occur in England during the Civil War?
How does ready-made clothing compare with that of twenty-five years ago in completeness?
Give a complete list of cloths used for wearing apparel in dress goods, underwear, etc. See how long you can make the list. Give the same of ready-made clothing.
What are velvet, plush, beaver, satin, etc.?
What determines the fineness of a piece of cloth?
Locate cotton and woolen mills throughout the world.
Can you trace the sap of the rubber tree until it comes to you in the shape of a pair of rubbers?
What do we mean when we say warp, filling, selvage, etc.?
You notice a beautiful plume in a milliner's window. Where did it come from?
Correlated Subjects: See different raw materials mentioned.

QUESTIONS.—LEATHER.

- How are the skins of animals made into leather?
What is made from the skins of large animals such as the horse, ex, etc.?
How is tanning accomplished? How is the softening hastened? How is the hair removed?
What is done to prevent the formation of hard and brittle leather?
How long does it take to accomplish the tanning of large hides?
What skins are prepared by tanning?
From what is sole leather made? How is morocco leather made? Patent leather?
What country manufactures the best leather in the world?
The bark of what well-known tree is used in tanning?

Sugar

I. SOURCES.

1. Sugar Cane.

- a. Where grown?
 - Foreign.
 - United States.
- b. Description.
 - Height.
 - Leaves.
 - Resembles what plant?
- c. Sugar mills.
 - Processes.
 - Crushing stalks.
 - Reduction of sap.
 - Refining, etc.
- d. Products.
 - Granulated sugar.
 - Loaf sugar.
 - Brown or raw sugar.

2. Beets.

- a. Where grown?
 - Foreign.
 - United States.
- b. Sugar mills.
 - Processes.
 - Slicing beets.
 - Drawing juice.
 - Refining, etc.

3. Maple Sap.

- a. Where produced?
- b. Season.
- c. Securing sap.
- d. Sugar-making (see sugar cane).
- e. Flavor, value, etc.

4. Sorghum.

- a. Resembles what plant?
- b. Process (see sugar cane).
- c. Product.
 - Syrup.
 - Sugar—not of commercial importance.

II. SUGAR REFINERIES.

- 1. Location of.
- 2. Work of refining.
- 3. Annual output cane sugar, beet sugar.
- 4. United States.
 - a. Annual output of cane sugar.
 - b. Annual output of beet sugar.
 - c. Annual consumption of sugar.
 - d. Annual importation of sugar.
 - e. Annual consumption of individual.

III. BY-PRODUCTS.

- 1. Molasses and Syrups.
 - a. Sorghum.

- b. New Orleans molasses.
 - c. Foundation for all syrups.
 - 2. Bagasse. How used?
 - 3. Beet Chips. How used?
- IV. USES.
- 1. Food.
 - 2. Medicine.
- V. COMPARISON.
- 1. One ton cane produces?
 - 2. One ton beets produces?
 - 3. Four pounds maple sap produces?

QUESTIONS.—SUGAR.

How many pounds of sugar are made from a ton of beets? From a ton of West India cane? Louisiana cane?

How many pounds of sugar are used to each individual yearly in the United States?

What is the sugar you use daily made from—beets, sugar cane or maple sap? How is loaf sugar made?

In what cities are some of the sugar refineries located in the United States? How many beet sugar factories are there? With what product do they work? What stage of the work do they handle?

How many thousands of tons of beet sugar are produced yearly in the United States?

What are the chief uses of maple sugar? What states in the Union lead in its production?

What is sorghum? Why is not the cane suitable for sugar?

What do we mean by raw sugar? What is "C" sugar? Brown sugar?

How is sugar regarded as a food? What is the effect upon the body?

What islands lead in the raising of sugar cane?

What states in the Union lead in the production of sugar?

What foreign countries lead in this enterprise?

How does the cane in the tropics compare with that of cooler climates?

What becomes of the crushed stalks?

Upon what does the growth of the sugar cane depend largely?

For how long a period does one planting last? Is this an important factor?

Why is maple sugar so highly prized?

What is done with the beets after extraction of the sugar? With the cane stalks?

What color is the raw sugar? What is used to whiten it?

Tell some of the domestic uses of sugar. What is candy made from?

What vegetables contain sugar? What grains? What liquids?

Think carefully of the different kinds of food and ascertain how many of them contain sugar in some form.

Salt

KINDS.

Rock, Salt Water, Brine Springs.

What is the great difference between salt and sugar other than in taste? In how many respects are they alike?

NOTE.—The great Austrian salt mine at Wieliczka has 600 miles of galleries and employs 9,000 miners. It has been worked for the past six centuries.

Where is salt extracted from sea water, principally produced?

By what process of drying is the purest variety produced?

What is salt made from sea water generally called?

From what source is the most salt produced?

Where in the United States would you find rock salt? Salt made from springs or wells?

In what inland state is found a lake whose waters yield fourteen pints of salt to every five gallons evaporated?

USES.

For seasoning.

For preserving.

For glazing pottery.

For hardening soaps, clearing glass, etc.

For what has salt been used since the earliest times?

What is it used for in manufacturing?

Of what chemicals is it the chief source?

SOURCES OF SUPPLY.

Foreign Countries.

United States.

a. Michigan.

c. Utah.

e. New York.

g. Pennsylvania.

b. Kansas.

d. Louisiana.

f. Ohio.

h. Illinois.

Where were salt mines worked extensively in the twelfth century and for what are they famous?

What is the leading salt-producing state in the Union?

What was the total production in the United States in 1902?

To what remarkable depth have the mines near Saginaw Bay, Michigan, been sunk?

Where is there an island of 144 acres of pure salt? How many tons is it estimated to contain?

With salt selling at two cents per pound what would be the value per acre of this island?

On what river's bank in Nevada is there a bluff of salt twenty-five miles long?

MISCELLANEOUS QUESTIONS.

Under the letter "A" in THE NEW PRACTICAL REFERENCE LIBRARY we have selected at random a few questions given below to which answers will be found by looking up subjects capitalized as *Aladdin*, *Alamo*, etc. Thousands upon thousands of similar questions will be found interestingly and satisfactorily answered throughout the LIBRARY and will furnish an endless chain of profitable study.

Who was the founder of the *Abolitionist* party? Who were some of its prominent leaders?

When did *Abruzzi* make his famous trip to the North Pole and what high latitude did he attain?

How is *Acetylene* gas produced? How does it differ from ordinary illuminating gas?

Who was *Achilles*? All but what small part of his body was invulnerable?

What is an *Acrostic* poem? In what style of verse has it been used?

What President of the United States was elected and served in Congress after the presidency?

For what is *Jane Addams* famous?

What is the proper form of *Address* in addressing the President? A governor? An archbishop?

Why is the *Adjutant* bird protected in India by law? Why its name?

What are the common *Adulterations* of food products? How is coffee adulterated? Bread? Milk? Tea? Pepper? Tobacco?

What enormous sum is expended every year for *Advertising* in the United States?

What is the story told in the *Æneid*, the great epic poem? By whom was it written?

Name five of the fables accredited to *Æsop*.

How does the area of *Africa* compare with that of North America? Of Asia? Europe?

How does the population of the British colonies in Africa compare with the population of the British Isles?

Who was *Louis Agassiz* and for what is he noted? For what is his son famous?

Where and when was the first *Agricultural* college established? What allusion was made to such a college by Washington in his first message?

What studies are included in the course of study and what experiments are made?

What is strange and peculiar about the *Aino* people?

How many parts of *Air* is oxygen? Nitrogen?

Describe the *Air brake*. By what means does it work automatically?

Describe the principles of the *Air Pump*. What happens to a lighted candle placed under the receiver as the air is exhausted? To a bell? An apple? What does this prove? Who invented the air pump?

What is the popular name of *Alabama*? In size how does it compare with your state?

What was the enormous loss inflicted on the Federal merchant fleet and how many vessels were captured by the "*Alabama*?"

What was *Aladdin's lamp*? Give a brief description of its many mystic wonders.

Why is the *Alamo* called the "Thermopylæ of America?"

For what remarkable length of time was the Alamo successfully defended and by how many?

How does the length of *Alaska* from north to south compare with the distance from Washington to New Orleans?

What is the size of Alaska? How does that compare with Texas and California combined?

When and from whom was Alaska purchased by the United States and at what price?

Which is the more valuable, the production of gold or the fisheries of Alaska?

Give five reasons why the purchase of Alaska was a bargain to the United States.

What was Alaska's population in 1900? Of these how many were whites? If the territory were cut up into equal parts how many sections would fall to the lot of each man, woman and child?

Which has the larger population, Nome, Alaska, or Trenton, N. J.?

What building in *Albany*, N. Y., cost over \$24,000,000? For what is it noted?

What is an *Albino*? What causes the lack of color?

Why is *Alcohol* used in thermometers for recording very low temperatures? What is wood alcohol?

What was *Louisa May Alcott's* most famous book?
 For what was *Alexander the Great* famous?
 What makes *Alfalfa* especially valuable in times of drought? How many tons are raised per acre?
 What qualities of greatness distinguished *Alfred the Great* from the many monarchs to whom the title "Great" has been given?
 What is the science of *Algebra*? To what remote period does it date?
 How many *Algonquin* Indians remain in Canada and the United States?
 What were the *Alien* and *Sedition* laws?
 When and where were *Almanacs* first used? For what were they so long popular? What was the most famous American almanac? English?
 What are some of *Alma-Tadema's* well-known paintings?
 What is the oldest of all *Alphabets*? From what is the English alphabet derived?
 What is the general form of the *Alps*? For what are they noted? What are the two highest peaks? How are the glaciers formed?
 What two animals are common to the Alpine region? Why?
 What is *Aluminum*? When was it discovered? What are its principal qualities and uses?
 How does the *Amazon* River compare in size with the Mississippi? What causes the water to raise thirty feet in the mouth of the river at a certain time each month?
 What are the duties of an *Ambassador*? When are ambassadors ordinary? Extraordinary? Plenipotentiaries?
 What is *Ammonia*? Name some of its uses?
 What is the height of some of the peaks of the *Andes*?
 The *Angel* fish is very ugly and voracious; then why so named?
 What is an *Anesthetic*? What are some of the common forms in which administered?
 What are some of the artificial baits used in *Angling* and from what and how made?
 How have we come to have a knowledge of *Animal Intelligence*? Is the vision, hearing, memory, smell and taste of animals greatly developed? Give examples of each.
 How does nature protect certain kinds of *Antelopes*?
 Where is *Antioch* located? When did it have a population larger than that of Cincinnati?
 What is an *Antiseptic*? Name several in common use.
 How does the brain of the *Ape* compare in size to man's?
 What are the symptoms of *Appendicitis*? When is death from this disease almost certain?
 What is an *Aqueduct*? What is the size of the Croton aqueduct and where located?
 What is the story of the *Arabian Nights*?
 Where is *Ararat* Mount and how is it linked with Noah's ark?
 What is *Arbitration*? What is a recent notable example?
 When was *Armor Plate* first used on war vessels?
 Who was *Benedict Arnold*? How did he die?
 Describe the formation of *Artesian* wells.
 From what and how are *Artificial* limbs made?
 What is *Asbestos*? Where is it obtained? For what is it useful? What workmen wear mittens made from it and why?
 Give some of the qualities of asbestos. Where is it obtained? For what is it most commonly used?

How is *Association Football* played? How does it differ from the Rugby style of playing?

By what means can you ascertain if you are affected with *Astigmatism*?

What animal furnishes the *Astrakan fur*?

What is an *Attachment* in law? An *Attainder*?

The *Audubon Society* is doing what creditable work?

What causes the *Aurora Borealis*, or northern lights?

Who is *Alfred Austin*?

What is an *Avalanche*? Where did one fall containing a quarter of a million tons of snow?

Where are the *Azores*? To what country do they belong?

QUESTIONS.—LIFE-SAVING SERVICE.

What is the life-saving system?

When was it established in the United States?

How many life-saving stations in the country?

Of how many persons is a crew made up?

What is the head of the crew called?

When the waves are too high to use a life-saving boat, how are rescues made?

How and by what means are lives saved from vessels out of reach of the lifeboats?

Besides the saving of lives what constitute some of the important duties of the life-saving crew?

What is a buoy? A life-saving gun? A rocket?

CURRENT EVENTS.

Should both the President and Vice President suddenly die or become disabled from holding office, who would succeed to the presidency?

How many lives were lost in the Kingston disaster of 1907?

How many people are employed by the postmaster-general?

What is the average number of people to each postoffice in the country? Why are there fewer postoffices today than in 1900?

Who is the speaker of the House of Representatives?

Who is the present Secretary of State? Of War? Of Agriculture? Who is Chief Justice of the Supreme Court? How many chief justices since Washington's administration?

What two bodies of water will the Panama Canal connect? What will be its length? What is its width? Depth?

What is reciprocity? Why do manufacturers of certain products oppose reciprocity treaties? Cite a recent example.

How is free trade considered by most economists? What advantages would free trade bring you? What disadvantages?

If you sent goods to London or Paris would you be required to pay any custom duties on same to our government? If you purchased goods in either of the two cities or any other foreign city, would you be required to pay duty on them, and to whom?

What relation are Emperor William and King Edward?

Where is the Williamsburg Bridge? What is its length? How does it compare with the Brooklyn Bridge?

What industry would you find along the Columbia River?

Who is at the government head of the Philippine Islands? Is he elected or appointed, and by whom?

Of what are the native houses of the Philippine Islands made? (Observe the illustration.)

What is the Duma? How does it correspond to our lower house of congress?

When did Oklahoma become a state? What is its popular name?

Who is the present king of Spain? How old is he?

What two points will the Cape-to-Cairo Railway connect, and what will be its length?

From your location what would be the shortest and quickest route to Manila? Would this have been so before the completion of the Suez Canal?

Were you to visit Newfoundland what would you find the people chiefly interested in? The people of Cuba? Of Alaska? Of Hawaii?

What are some of Bryan's principles of government reform?

What would be the several modes of transportation you could avail yourself of in going from place to place in New York city? In London? In Venice?

What are the different motive powers in automobiles? Which so far has proven the most satisfactory? Why?

Were you to seek a clerkship in any of the government departments, in what subjects would you have to pass an examination? What per cent of proficiency would you have to show to become eligible to appointment?

Who is Nicola Tesla, and for what is he world-famous?

What is the Associated Press? How many newspapers are printed and folded per hour by some of the large printing presses?

How many newspapers are there in the United States?

How many Philadelphias would London make?

Overburden not thy memory to make so faithful a servant a slave. Remember Atlas was weary. Have as much reason as a camel, to rise when thou hast thy full load. Memory, like a purse, if it be overfull that it cannot shut, all will drop out of it; take heed of a gluttonous curiosity to feed on many things, lest the greediness of the appetite of thy memory spoil the digestion thereof.

—Thomas Fuller.

“ 'Tis education forms the common mind,
As the twig is bent, the tree's inclined.”—*Pope*.

Education

The department of EDUCATION in THE NEW PRACTICAL REFERENCE LIBRARY is divided into two general divisions. *Education* treats of the subject, first, in a general way, showing what education is and describing the different systems of education. This article is followed by another general article on the HISTORY OF EDUCATION. This begins with the earliest educational movements known in history and traces the successive steps down to the present time. Each important transition is indicated by subheads, as you will see by looking at the article. From the general view of the education of the world the subject passes to public education, treating first that in our own country, under the heads of *Common Schools, Evening Schools, Secondary Education, Academy, High School, College, University*. It then passes to the public education of other countries, which is described in the article *Education, National Systems of*. The next division of the subject is *Education of Special Classes*, which includes articles on the education of the blind, deaf and dumb, feeble-minded, indian and negro. Under some of these you will notice that special schools or other subjects are included. This indicates that these schools or these subjects are closely related to the education of the class under which they occur, as *Tuskegee Normal and Industrial Institute, Peabody Education Fund and Negro, Education of*. The next division, *Special Education*, treats of those special lines of instruction which have for their purpose training along certain well-defined lines. Under this subdivision you will notice the articles pertaining to industrial, commercial and professional education. The schools named in this division are those devoted especially to the class of work under which they are found. The division *Colleges and Universities* is very complete of our own and other leading countries. Women's colleges in the United States are also described. The division *Special Schools* includes such as the agricultural colleges, military and naval academies and reform schools.

The division *Educational Organizations* includes the important societies and associations of this country devoted to educational purposes, also the *British Association for the Advancement of Science*. The *Agassiz Association* and *Audubon Society* are both of interest to children, since they have become widely established among the school children over the United States.

LIBRARIES.

Since libraries are important educational aids, they have been classed under this department. The general article *Library* gives an excellent exposition of the library movement and contains brief descriptions of a number of the leading libraries in the United States and other countries. You will notice that this list closes with the *Library of Congress*, the most important institution of the kind in America.

MUSEUMS AND EDUCATIONAL EXTENSIONS.

The division *Museums* is inserted under *Education* for the same reason that the division *Libraries* is, and is treated in the same comprehensive way. The educational extension movements include such organizations having for their purpose the spread of education among people who are so situated that they can not attend regular schools of either secondary or college grade.

EDUCATION.

- I. EDUCATION. General article, including a definition of the term and classification of the systems of education.
- II. EDUCATION, HISTORY OF. General article, containing sketch of educational movements from the earliest history to the present time.
- III. PUBLIC EDUCATION.
 1. Common Schools.
 2. Evening Schools.
 3. Secondary Education.
 - a. Academy.
 - b. High School.
 4. College.
 5. University.
 6. Education, National Systems of.
- IV. EDUCATION, SPECIAL CLASSES.
 1. Blind, Education of.
 2. Deaf and Dumb, Education of.
 3. Feeble-Minded, Education of.
 4. Indian, Education of.
 - a. Hampton Normal and Industrial Institute.
 - b. United States Normal and Industrial Training School.
 5. Negro, Education of.
 - a. Tuskegee Normal and Industrial Institute.
 - b. Peabody Educational Fund.
 - c. John F. Slater Fund.
- V. SPECIAL EDUCATION.
 1. Kindergarten.
 2. Manual Training.
 - a. Sloyd.
 3. Technical Education.
 - a. Polytechnic Schools.
 - b. Cooper Union.
 - c. Drexel Institute.
 - d. Massachusetts Institute of Technology.
 - e. Pratt Institute.
 - f. Carnegie Institution.
 4. Commercial Education.
 5. Professional Education.
 - a. Dental Schools.
 - b. Journalism, School of.
 - c. Law Schools.
 - d. Medical Schools.
 - e. Normal Schools.
- VI. COLLEGES AND UNIVERSITIES. All state universities and the other large universities of the United States, like University of Chicago, Cornell

University, Princeton University, and all the important colleges, such as Dartmouth College, Amherst College, and the colleges for the education of women—Smith, Vassar, Wellesley, Bryn Mawr—together with the leading universities and colleges of Europe, are included in this subdivision.

VII. SPECIAL SCHOOLS.

1. Agricultural College.
2. Agricultural Experiment Station.
3. United States Military Academy.
4. United States Naval Academy.
5. Reform Schools.

VIII. EDUCATIONAL ORGANIZATIONS.

1. Agassiz Association.
2. Audubon Society.
3. American Forestry Association.
4. American Association for the Advancement of Science.
5. British Association for the Advancement of Science.
6. National Educational Association.

IX. LIBRARIES.

1. Library.
2. Alexandrian Library.
3. Bibliotheque Nationale.
4. Library of Congress.

X. MUSEUMS.

1. Aquarium.
2. British Museum.
3. National Museum of the United States.
4. Smithsonian Institution.

XI. EDUCATIONAL EXTENSION MOVEMENTS.

1. Chautauqua Literary and Scientific Circle.
2. Correspondence Schools.
3. Lyceum.

XII. BIOGRAPHIES OF LEADING EDUCATORS. This division includes an extended list of biographies of the educators whose work has produced a marked effect upon the educational history of the world. The list includes both American and European educators of note.

QUESTIONS ON EDUCATION.

What is the purpose of physical education?

What is the aim of intellectual education?

With what does moral education deal?

What is included in primary education?

What instruction is included in secondary education?

What is higher education?

What is the purpose of professional education?

How is special education supported in the United States?

HISTORY OF EDUCATION:

What is meant by education? How old is it?

What was a common characteristic of the education of the oriental nations?

What characteristic of the Hebrew education was in marked contrast to the educational systems of other oriental nations?

Which was the more complete, the Spartan or the Athenian education?

Was the early Roman education practical or æsthetic?

How did the introduction of Greek culture affect it?

To whom do we owe the preservation of the masterpieces of classic literature?

By whom were the most influential movements in the interest of general education made?

What was the culmination of all these movements?

MODERN EDUCATION:

How are modern methods of instruction in elementary schools traceable to the Reformation?

Through what religious organization did the Catholic church establish and maintain a high order of schools?

How long after the Reformation until public education was removed from the control of the church to that of the state?

What state furnished the model after which the public school of our northern colonies patterned?

When was Harvard College opened?

When and where was William's and Mary's College opened?

What were the most important causes in bringing education in the United States to its present degree of efficiency?

QUESTIONS.—KINDERGARTEN.

What does "kindergarten" mean? Who established the first kindergarten?

Who was Froebel? When did he live? Children of what age attend the kindergarten?

What is the principle of kindergarten training? A model kindergarten should be how large?

In what country are kindergartens common? When was the work introduced systematically in the United States?

What colleges provide means for a thorough training for kindergarten teachers?

QUESTIONS.—LIBRARY.

Where and when were libraries first established?

What is the most noted library of ancient times?

What invention gave great impetus to libraries?

Where is the largest library in the world today, and how many million volumes does it contain?

Name five noted libraries of Europe, giving location.

What is the most noted library in the United States?

Name ten of the most important in our own country.

How many in the United States?

What are traveling libraries?

Describe the Library of Congress. What did the building cost?

QUESTIONS.—ALPHABET.

What is the oldest of all alphabets?

By what means were the Egyptian characters transformed into Phœnician letters?

How many letters in the original Greek alphabet? The Phœnician? Latin?

Is an alphabet essential to the writing of a language?

What is unusual about the Chinese mode of written expression?

QUESTIONS.—COMMON SCHOOLS.

What is meant by common schools?

EARLY HISTORY:

What was the system of education in the ancient oriental nations?

To what classes was education confined?

What two great rulers extended the educational influence of their empires during the middle ages?

From what ranks did the teachers come?

REFORMATION:

What two great events led to the establishment of public schools throughout Europe?

What great leader made public schools a necessity to his followers?

What made it possible to supply the people with books?

ESTABLISHMENT OF COMMON SCHOOLS:

What countries were the first to establish common schools?

What war in Europe greatly hindered the progress of education?

FRANCE:

What events in France made government aid impossible in that country?

Where were public schools under state aid finally founded?

What country of Europe was the first to establish and support common schools?

ENGLAND:

Why were the common schools of England called board schools?

When were they established?

Why were the early elementary schools of England known as dame schools?

UNITED STATES:

When and where were the first schools established in the United States?

How were they maintained?

What two colonies were the next to follow?

What important part did the Swedish colonists take in education?

When and in what colony was a system of public schools organized by the Dutch?

What system of education was established in the southern colonies?

What condition in early times made free public schools odious, hindering their progress?

When was the Public School Society of New York formed? For what purpose? What did the plan include? Results?

SUPPORT:

What ordinances provided for the first grant of public lands?

How many acres are included in the congressional land grants?

What led to state control of the school funds?

In what way does Illinois derive a revenue from her school lands?

What is meant by the district system? Township? City?

Who is at the head of the department in every state?

How many pupils are enrolled in the common schools of the United States?

How many teachers are employed?

Manual Training

ORIGIN AND INTRODUCTION.

- 1880 Washington University.
- 1882 Dwight School.
Sloyd System.
- 1903 National Educational Association.
- 1905 Committee Report.

PURPOSES.

- To enable the child to enlarge his powers of expression.
- To make him acquainted with the nature and use of the most common materials.
- To lead him to develop a certain degree of skill in the use of tools.
- To develop his originality.
- To connect the work of school with the affairs of everyday life.

VALUE—Practical

- It increases the pupil's power to do.
- It gives a degree of skill in the use of tools.
- It schools in the value of material.
- It teaches the dignity of labor.

VALUE—Cultural.

- It demands concentration of attention.
- It requires organized thinking.
- It demands an exercise of the will power.

DANGEROUS TENDENCY.

NEED OF TRAINED TEACHERS.

CORRELATED SUBJECTS.

BIBLIOGRAPHY.

QUESTIONS.

Is manual training instruction a regular feature in the school system of every large city?

Why did the committee not recommend the general introduction of such teaching in one-room schools?

Should such instruction be given only for its utility value?

Should teachers be selected from among artisans, or must they be professionally trained to be successful?

At what time in school work should manual training be introduced?

What department of the elementary schools are closely allied with manual training?

Does the instruction have a distinct industrial value for those who may earn a living by their hands?

What is the first essential of good citizenship?

Distinguish between technical education and manual training.

Sloyd was first introduced into the schools of what countries? Who extended the system?

Basketry

I. WOVEN BASKETS.

1. Form.

- a. Twill work.
- b. Wicker work.
- c. Checker work.
- d. Twined work.

2. Material.

- a. Splints.
- b. Rods.
- c. Braid or bark.

II. COILED BASKETS.

1. Style.

- a. Open work.
- b. Close or stitched.

2. Material.

- a. Raffia.
- b. Rods.

QUESTIONS.

What people make baskets from raffia so small that they could be passed through a lady's finger ring, and others larger than a barrel?

What place has basketry among the mechanic arts?

In what ways do the American indians excel all other uncivilized tribes in this art?

The manufacture of baskets includes what?

Upon what does the labor and process depend?

What is the simplest form of woven basketry?

Of what does *twill* work consist?

Among the Rocky Mountain indian tribes what style is common?

How are *coiled baskets* made?

What is a striking feature of coiled baskets among the indians?

By what means does the basket-maker add to the grace and beauty of the basket?

Why has basketry been adopted for a portion of the industrial work in the schools?

What is raffia? What are textiles?

What style of basket-making is represented in Figure 5 in the illustrations?

Much as a man gains from actual conflict with living minds, he may gain much even of the same kind of knowledge, though different in detail, from the accumulated thinking of the past. No living generation can outweigh all the past. If books without experience in real life cannot develop a man all around, neither can life without books do it.

There is a certain dignity of culture which lives only in the atmosphere of libraries. There is a breadth and a genuineness of self-knowledge which one gets from the silent friendship of great authors without which the best work that is in a man cannot come out of him in large professional successes.

—Phelps.

The value of a library depends not upon the number of its books but upon their character.
—*Carlyle*.

Geography

The study of GEOGRAPHY was formerly made from the standpoint of the description of the earth's surface, but we now study it as the abode of man.

Since the relation of the earth to man is the central idea, the things immediately at hand should be studied first. In the outline submitted we begin with the school district, township, city and county. You, of course, would not expect to find in any general reference work local data to supply this information, but with the assistance of this Classified Topical Outline the information can be easily secured, and is of practical value.

Your own county and state have a geography more fascinating and interesting than any other country; yet our pupils, and not infrequently our teachers, know more of the jungles of AFRICA or the ARCTIC wilds than of their own commonwealth.

These outlines covering local geography are followed by general outlines applicable to any city, any state and any country.

In addition to the general outline we are more specifically taking BOSTON as a city, CALIFORNIA as a state, UNITED STATES as a country and AFRICA as a grand division, and from the information which we furnish in THE NEW PRACTICAL REFERENCE LIBRARY, have developed model outlines which a student can adapt to his study of the various divisions and subdivisions.

It is not the aim of the editor to make this series of outlines exhaustive, but suggestive, and to furnish such models that the ambitious teacher and aspiring pupil can have suitable direction along the line of self-culture, which is the only practical education.

Geography in its true sense will bring before the student the products of the soil and the mill; the location of commercial highways; the effect of climate upon the productions and the peoples; the study of the natural resources which supply food and occupations of men; the reasons for the founding of cities at proper localities rather than elsewhere; the forms of government; the religion as practiced in the various countries, etc.

The study of geography in this way will give us the location of places, boundaries, etc., incidentally, and such information will become secondary and will be fixed in the mind permanently without a special study of same.

Physical, Mathematical, Political

Geography is divided into the great departments *Physical Geography* or *Physiography* (see *Physiography*), *Mathematical Geography*, *Political Geography*, which depends upon the other two divisions. Geography cannot be well taught without a thorough knowledge of the subject and a knowledge of correct methods of teaching. See *Geography, Methods of Teaching*.

Local Geography

I. SCHOOL DISTRICT.

1. Area.
2. Sections included.
3. Dimensions.
4. Bound by districts.
5. Census.
6. Population to square mile.
7. Per cent attending school.
8. Assessed valuation.
9. Per cent tax levy.
10. Cost of one year's schooling.
11. Who pays it?
12. Officers, duties, etc.
13. Map district—streams, houses, etc.
14. Historical.

II. TOWNSHIP.

1. Area.
2. Position.
3. Extent.
4. Bound by townships.
5. Congressional.
6. Municipal, civil.
7. Range.
8. Physical features.
 - a. Streams, lakes, ponds.
 - b. Forests, groves.
9. Advantages.
10. Improvements.
 - a. Churches, schools, etc.
11. Township organization.
12. Officers.
13. Towns.
14. Old settlers.
15. Map.

III. CITY.

1. Class.
2. Charters.
3. Officers.
 - a. Names.
 - b. Duties.
 - c. Terms.
 - d. Salaries.
4. Levying and collecting taxes.
5. Administration of justice.
6. Police inspection.
7. Fire department.
8. Care of streets.
9. Sewerage.
10. Water supply.
11. Municipal ownership.
12. Municipal government.
13. Public parks, buildings, boulevards, etc.
14. Prisons.
15. Supervision of the liquor traffic.
16. Regulation of street railways.
17. Subways.
18. Building regulations.
19. Transportation.
20. Suburbs.
21. Supervision of charities.
22. Position and extent.
23. Commerce and industry.
24. History.
25. Population.

IV. COUNTY.

1. Define.
2. How change boundary.
3. Dimensions.
 - a. Extent.
 - b. Area.
4. Shape.
5. Boundaries.
6. Latitude.
7. Longitude.
8. Position in state.
9. Relief.
 - a. Mean elevation.
 - b. Highest elevation.
 - c. Comparative elevation.
10. Population.
 - a. Square miles.
 - b. Increase in ten years.
 - c. Per cent of increase.
 - d. Rank.
11. Schools.
 - a. Enumeration.
 - b. Enrollment.
 - c. Per cent enrollment of enumeration.
 - d. Graded.
 - e. District.
 - f. Private.
 - g. Number of districts.
12. Railroads.
 - a. Steam and electric.
 - b. Names.
 - c. Miles.
13. Townships.
 - a. Names.
 - b. Number.
 - c. Congressional.
 - d. Municipal.
 - e. Largest, smallest.
14. Range and township numbers explained.
15. County officers.
 - a. Names.
 - b. Duties.
 - c. Terms.
 - d. Salaries.
16. Streams.
17. Lakes and ponds.
18. Resources.
19. Towns, with population.
20. Metropolis.
21. County seat—why so called?
22. Highest building.
23. Public buildings and institutions.
24. Manufactures.
25. Newspapers.
26. Historical.
 - a. When settled.
 - b. When organized, etc.
27. Map—Use quadrille paper for beginners, counting each square one mile, or one-fourth mile, according to the size of your paper.

State Geography

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| <p>I. POPULAR NAMES.</p> <p>II. LOCATION.</p> <ol style="list-style-type: none"> 1. Latitude and longitude. 2. Position in the country. 3. Boundaries. <p>III. EXTENT.</p> <ol style="list-style-type: none"> 1. Length. 2. Breadth. 3. Area. <p>IV. SIZE.</p> <ol style="list-style-type: none"> 1. Absolute. 2. Relative. <p>V. TREND.</p> <p>VI. OUTLINE.</p> <ol style="list-style-type: none"> 1. Form. 2. Regular or irregular. <p>VII. COAST LINE.</p> <ol style="list-style-type: none"> 1. Length. 2. Indentation. 3. Projections. <p>VIII. SURFACE.</p> <ol style="list-style-type: none"> 1. General idea. 2. Watersheds. 3. Hills and mountains. 4. Plains. <p>IX. NATURAL CURIOSITIES.</p> <p>X. DRAINAGE.</p> <ol style="list-style-type: none"> 1. River systems. 2. Special streams. 3. Sources—lakes and springs. | <p>XI. CLIMATE.</p> <ol style="list-style-type: none"> 1. Causes. 2. Healthfulness. 3. Adaptation to industries. 4. Compare with other localities. <p>XII. INDUSTRIES.</p> <p>XIII. PRODUCTS.</p> <ol style="list-style-type: none"> 1. Agricultural. <ul style="list-style-type: none"> Crops. Domestic animals. Dairy, etc. 2. Mineral. Fuel. Ores. 3. Manufacturers. <p>XIV. PEOPLE.</p> <p>XV. CITIES.</p> <p>XVI. INTERNAL IMPROVEMENTS.</p> <p>XVII. COMMERCE.</p> <ol style="list-style-type: none"> 1. Railways and canals. 2. Navigable rivers. 3. Commercial centers. <p>XVIII. GOVERNMENT.</p> <p>XIX. CIVIL DIVISIONS.</p> <p>XX. EDUCATION.</p> <ol style="list-style-type: none"> 1. Common schools. 2. Higher institutions. 3. Eleemosynary institutions. <p>XXI. STATE INSTITUTIONS.</p> <p>XXII. HISTORICAL.</p> <ol style="list-style-type: none"> 1. Settlement. 2. Admission. 3. Places of historical interest. <p>XXIII. MISCELLANEOUS.</p> |
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United States

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| <p>I. LOCATION.</p> <p>II. BOUNDARY.</p> <p>III. EXTENT.</p> <p>IV. COASTAL FEATURES.</p> <p>V. SURFACE AND DRAINAGE. (See Relief Map.)</p> <ol style="list-style-type: none"> 1. The Atlantic Slope. 2. The Appalachian Highlands | <ol style="list-style-type: none"> 3. The Great Plain. 4. The Rocky Mountain Highlands. 5. The Pacific Slope. 6. Rivers. 7. Lakes. <p>VI. CLIMATE.</p> <ol style="list-style-type: none"> 1. Temperature. 2. Rainfall. (Rain Map.) |
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NOTE.—Since thinking in images is easier for beginners than thinking in symbols, the instruction in geography should begin with child-life at home, with the things on the breakfast-table, with the garments worn and the means of transportation used, and proceed from these to the life, the home, the dress, and the sports of children living in other lands and other climes. The lessons in geography make constant appeals to the imagination, and call for thinking in images or mental-pictures in connection with map-symbols and the discussions of causes and laws.

—From Schaeffer's "Thinking and Learning To Think."

- VII. MINERAL RESOURCES.
1. Coal. (See COAL.)
 2. Petroleum. (See PETROLEUM.)
 3. Iron. (See IRON.)
 4. Gold and silver. (See GOLD; SILVER.)
 5. Other metals.
 6. Building stones.
- VIII. VEGETATION.
- IX. ANIMAL LIFE.
- X. AGRICULTURE.
1. Cereals.
 2. Cotton and tobacco.
 3. Other crops.
 4. Live stock.
- XI. FISHERIES.
- XII. MANUFACTURES.
1. Resources and causes of development.
 2. Location of manufacturing districts.
 3. Leading industries.
 - a. Iron and steel.
 - b. Textiles.
 - c. Leather.
 4. Other industries.
- XIII. TRANSPORTATION AND COMMUNICATION.
1. Waterways.
 2. Railroads.
 3. Roads.
 4. Communication.
- XIV. COMMERCE.
1. Domestic commerce.
 2. Foreign commerce.
- XV. POPULATION.
1. Increase in population. (Table.)
 2. Movement westward. (Map.)
 3. Density. (Map.)
 4. Growth of cities.
 5. Immigration.
 6. Color.
 7. Present character.
- XVI. GOVERNMENT.
1. General character.
 2. Legislative department.
 3. Executive department.
 4. Judicial department.
 5. Colonial possessions.
 6. State government.
 7. Territories.
 8. Finance.
- XVII. POLITICAL DIVISIONS.
- (See Table.) (This table gives the name of the state, its popular name, area, date of admission into the Union, population, colored population, and number of representatives in congress.)
- XVIII. EDUCATION.
- XIX. LITERATURE.
- XX. ART.
- XXI. CITIES. (Table.)
- XXII. HISTORY.
1. Discovery and exploration.
 2. Colonization.
 3. Colonial development.
 4. Development of Union.
 5. Revolutionary War.
 6. Articles of Confederation.
 7. Organization of the national government.
 8. Supremacy of the Anti-Federalists.
 9. The era of good feeling.
 10. John Quincy Adams.
 11. Democracy again in power.
 12. Texas and the Mexican War.
 13. Downfall of the Whigs.
 14. Slavery.
 15. Civil War.
 16. Reconstruction.
 17. Industrial progress and problems.
 18. Financial panic of 1893.
 19. Expansion. (Table.)
 20. Recent progress.
 21. Bibliography.

UNITED STATES.

NOTE.—In the great journal of things happening under the sun we, the American people, find ourselves in the peaceful possession of the fairest portion of the earth as regards extent of territory, fertility of soil and salubrity of climate.

—Abraham Lincoln.

QUESTIONS ON GEOGRAPHY—UNITED STATES.

Compare the areas of New York and Minnesota.

California is how many times the size of New Jersey?

Why is the Hudson of more importance to commerce than the Colorado?

What interferes with navigation on the Missouri River?

How does the Mississippi compare in length with the Volga?

Which has the greater volume of water, the Mississippi or the Amazon?

What river is of the oldest historic importance?

What are the Palisades of the Hudson?

Where is the Natural Bridge?

What bodies of water would you pass through in going from Superior to New York City?

What is the area of Yellowstone National Park?

What commercial advantages has Chicago?

How does the United States compare in size with Australia?

What principal cities would you pass in going by boat from St. Paul to New Orleans?

What bodies of water would you pass through in going from New York to Yokohama by way of Suez Canal?

How many cities has the United States with a population over 1,000,000? Over 500,000? Over 100,000? Name several.

When was your state admitted into the Union?

By the last census how many negroes resided in your state?

How many representatives are sent to congress by your state? What must be the increase in population before another can be added to the list?

By referring to the product map in article on United States, what states do you say constitute the spring wheat belt? The cotton group? The live stock territory? The wool regions? The fruit sections? Give reasons for your answer.

Where was the center of population of the United States in 1800? In 1850? In 1870? In 1900? (See outline map in article on United States.) How has the center of population traveled? Has it fluctuated much from north to south? What is remarkable about its progress?

Assuming the center of population will travel westward at the rate it has since 1860, where will it be in 1930? When will it reach Missouri? When Kansas, within whose borders is the geographical center of the country?

What was the percentage of increase in population of the United States from 1800 to 1810? From 1890 to 1900? Is the percentage increasing or decreasing?

While the size of California and Japan is approximately the same, how do they compare in population?

What state is popularly known as the Blue Grass State? Nutmeg State? Diamond State? Equality State? Sage Brush State? Flickertail State? What is the popular name of your own state?

What would be the population of Texas if as thickly settled as Rhode Island? How many Rhode Islands could be carved from Texas? How many from Pennsylvania? From Iowa? From California?

From observation of the map, what state is bounded on the north and east by the Mason and Dixon's line?

Which is farther north, St. Paul, Minn., or Augusta, Me.?

Which is farther south, San Antonio, Texas, or Tampa, Florida?

What are the abbreviations (which see) of the following: Louisiana, Maryland, Utah, Oklahoma, Long Island, Alaska?

What river (see map) separates Mexico from Texas? Ohio from West Virginia and Kentucky?

What is the length of the Atlantic coast line of the United States? The Pacific?

What is the greatest distance east and west?

Look at the illustration of plants of the United States and tell in what states you would see the following grow: Magnolia? Pineapple? Peanut? Banana? Castor oil plant?

In what sections would you find the following animals (see illustration): Kadiak bear? Moose? Buffalo? Alligator?

If all the professional fishermen of the United States were to locate in one place, how would the population of that place compare with that of Indianapolis? What were the 474 square miles of territory added to the United States in 1903?

What is the total area in square miles of territory purchased or annexed by the United States since 1800, and what is the total paid for it? How much would this be per acre?

Boston

HISTORY.

First settlement
Revolutionary war
Anti-Slavery movement
Fires
Population

COMMERCE AND INDUSTRY.

Transportation.

Railways—
(a) Steam
(b) Electric
(c) Elevated
(d) Subway
Harbor
Imports
Exports
Manufactures

Boulevards.

(a) Massachusetts Avenue
(b) Commonwealth Avenue
(c) Strandway

HOTELS.

Adams
United States
Parker
Quincy
Young's
Brunswick
Touraine
Vendome

THEATERS.

Boston Theater
Castle Square
Keith's
Tremont
Symphony Hall
Colonial
Majestic.

DESCRIPTION.

Location
Direction of streets
Business thoroughfares
Financial center

BOSTON COMMON.

Soldiers' and Sailors' Monument.
Shaw's Memorial

PUBLIC BUILDINGS.

Historic.

(a) Old Statehouse
(b) King's Chapel
(c) Old North Church
(d) Old South Meeting House
(e) Faneuil Hall

Suburbs.

- (a) Charleston
- (b) Roxbury
- (c) East Boston
- (d) Chelsea
- (e) South Boston

Modern.

- (a) Museum of Fine Arts
- (b) Trinity Church
- (c) Cathedral of Holy Cross
- (d) Public Library

TEST QUESTIONS ON BOSTON.

- Which has the larger population, Boston or St. Louis? Boston or Baltimore?
What famous university is within a few minutes' ride of the city?
What is peculiar about the way Boston is laid out?
From what point do the streets radiate?
Which streets are the important business thoroughfares?
Which street is the great financial center of the city?
How many miles of streets are paved?
For what is Charleston noted? What is interesting about Roxbury?
How are the numerous sub-divisions of Boston connected?
Why is such great interest attached to the *Common*?
What historic associations has it? How many acres does it cover?
How long has it been used as a pleasure ground? What noted monuments
are in the Common?
What event in history does the Soldiers' and Sailors' monument commemorate?
What noted statues are in the Public Garden?
Which is the most important of the historic structures?
When was the old State House built? What use has it served? What historic
scenes were enacted within this building?
When was King's Chapel established? How does it figure in history?
Why is Faneuil Hall known as the Cradle of Liberty?
What distinguishes the Boston Theater?
What theaters are worthy of mention?
Why is the Boston Public Library considered one of the finest buildings in
the country?
(a)
(b)
(c)
How many volumes does it contain?
What school in Boston is the most noted of its kind in the country?
What place does Boston occupy as a commercial and financial center?
In this respect how does it compare with New York?
What natural advantages has it for foreign commerce?
What other interests are centered here?
When was the first settlement on the peninsula made and by whom?
When was the first meeting house erected? The first school building?
What part did Boston take in the events which led to American independence?

History Topics (look up):

- (a) Boston Massacre
- (b) Boston Tea Party
- (c) Battle of Lexington
- (d) Battle of Bunker Hill

Name ten noted writers who have lived in Boston.

California

HISTORY.	CITIES.	SURFACE.	TRANSPORTATION.
<i>Spanish Explorations.</i>	Sacramento	Mountains	<i>Railways.</i>
(a) Cabrillo	San Francisco	Rivers	(a) Steam
(b) Drake	Los Angeles	Valleys	(b) Electric
Mexican territory admitted as a State?	Oakland	Lakes	<i>Commerce.</i>
	San Jose	Plains	(a) Rivers
AGRICULTURE.	Stockton		(b) Ocean
Grains	EDUCATION.	MANUFACTURES.	(c) Harbors
Fruits	Public schools	Shipbuilding	CLIMATE.
(a) Oranges	High schools	Sugar refineries	Ocean currents
(b) Prunes	Normals	Olive oil	Winds
(c) Grapes	Universities	Lumber	Altitude
(d) Nuts	State institutions	Canning	Rainfall
(1) Almonds			Latitude
(2) Walnuts			
Vegetables			

TEST QUESTIONS ON CALIFORNIA.

What white explorers visited California almost a hundred years before the settlement of Jamestown?

From what does California take its name? What was its first name?

How does the length of California compare with the distance from Indianapolis to New York City?

How many Rhode Islands could be carved from the State? How many New Yorks? Ohios?

How does California rank in size with Texas? With Montana? With Norway?

What would be California's population if as thickly settled as Massachusetts?

Which has the larger population California or Chicago?

What city in California doubled its population between 1890 and 1900?

How does San Francisco compare in population with Baltimore? St. Louis? New Orleans?

How does the output of the gold mines compare in value with the fruit industry?

Name five of the leading fruits of California found in your grocery store?

How many thousand carloads of oranges are produced every year?

What natural advantages has California for foreign trade?

What distinguishes the public school system of California?

In what year did the first American emigrant wagon reach the State?

At the breaking out of what war was California declared a republic?

When and by what treaty was it ceded to the United States?

What discovery led to an influx of settlers from all parts of the world?

When was California admitted to the Union?

Why is the climate of California entirely different from the eastern states in the same latitude?

Explain why the same fruits grow in the northern part as in the southern?

To what is the mildness of the climate due? How is the year divided as to seasons?

Does the rainfall vary in different localities? Is irrigation necessary in certain sections?

How many acres are devoted to grape culture alone?

Africa Outline with Questions

POSITION.

- What other grand divisions in the same hemisphere?
- Is it located wholly in the northern or southern hemisphere?
- Are more degrees of latitude embraced in its extent than that of Asia?
- Does it extend over more degrees of latitude than longitude?
- Contrast its position with that of Europe.
- Does its southern cape extend further south than the southern cape of South America?
- How many degrees south of where you live is the parallel of latitude which passes through Cairo?
- Does Africa stretch entirely across any one zone?
- Is there any other grand division which stretches entirely across this zone?
- What grand division of the new world occupies the same relative position?

SIZE.

- Compare the size of Africa with that of each of the other continents.
- How many continents are larger than Africa?
- How does it compare in size with Australia? With Alaska?
- How does its greatest width compare with that of Asia?
- What proportion of land in the torrid zone is contained in this grand division?
- Draw squares showing the relative size of the five grand divisions, inclosing the smaller within the larger.

BOUNDARIES.

- What oceans, seas and gulfs surround Africa?
- What strait separates it from Europe?
- What isthmus joins Asia and Africa?
- What canal crosses the isthmus?
- What cape forms the southern extremity of Africa?
- What waters would you pass through in going from the Atlantic to Madagascar by the shortest route?
- How does the coast line of Africa compare with that of Europe?
- Take an imaginary journey along its sea coast. Why is it peculiar?
- Is Africa really a peninsula?
- This continent shows a marked resemblance in outline to which one of the Americas?
- Which has the more compact configuration, Africa or Europe?
- How does Africa rank as to good harbors?
- Considering its size, how does its length of coast line compare with other continents?
- Why is it the most inaccessible continent?
- Why has this condition retarded commerce?
- Where are the first settlements naturally made when opening up a new continent?
- Make a simple sketch of the Atlantic and compare outline of Africa with South America in reference to its inlets, etc.
- What is the distance from London to Calcutta via the Suez Canal? Via the Cape Town route?

ISLANDS.

- What interesting fact is connected with the island of St. Helena?
- In what early exploration did a navigator land at Cape Verde Islands?
- Distinguish between oceanic and continental islands. What is the name of

the largest oceanic island? What is its size? How far from the mainland? How does this island compare in size with any individual state of the United States?

What coast islands are used as naval stations by the English? By the French?

Compare Madagascar with Cuba in regard to its latitude, area, outline, etc.

SURFACE.

Are the mountain ranges continuous or disconnected?

What is the important range of the northern section?

What is the greatest height of its peaks?

Describe the surface of Sahara.

What are the Wadys which cross the Sahara?

Where is the Sudan?

What mountains form the highlands at the head of the Gulf of Guinea?

From our relief map give the location of the principal mountain ranges.

Is it usual for the mountains to be located along the coast line? In what manner does this affect the country in regard to its rivers, exploration, commerce, inland and foreign, and its growth along other lines?

In what part of Africa are the loftiest mountains?

What section of Africa was explored by Livingstone?

What other noted explorer followed him? What was his primary object?

In what respect is the surface and soil of southern Africa similar to South America?

Would this continent be classed as a great plain or plateau?

Compare the plateaus of Africa with those of other continents in size, production, etc.

Locate the highlands of Africa. The lowlands. The fertile regions. The desert regions.

What part of America is in the same latitude as the highlands of Africa?

RIVERS.

What are the four great river systems of Africa?

How many of these flow into the Atlantic Ocean?

What two have their source in the equatorial regions?

What is it that obstructs navigation in these streams?

What determines the course of the following rivers: Nile, Kongo and Niger?

Are the rivers of Africa, generally speaking, suitable for commerce? Why?

How do the large rivers of Africa differ from those of North America? In what points do they resemble them?

Why is it possible for the Nile to flow through desert land for hundreds of miles with scarcely any tributaries?

Explain the causes and results of the overflowing of the Nile.

Contrast the Nile and the Mississippi rivers in reference to their length, width, navigation, and drainage. The same in reference to the Amazon.

Why do the systems of drainage of central Africa and central South America resemble each other?

What hindrances to exploration of central Africa has this condition offered?

Draw sketch showing drainage system of different sections of Africa.

What is the important river of the north? South? East? West? Central?

Upon what sources do the Nile and Kongo rivers depend for their abundant water supply?

What river offers the best entrance to central Africa?

LAKES.

How do the great lakes of Africa compare with those of other continents? Which is the largest lake? What is its size? How does it compare with Lake Superior?

In which lake does the Kongo have its source?

Where is Lake Chad? What is interesting about this lake?

Has Africa any salt lakes?

Our knowledge of the lake system of central Africa is largely due to what explorer?

In what part of Africa are the lakes generally found?

What lake is one of the sources of the Nile?

What rank do the lakes of Africa take in regard to size?

Have these lakes any commercial value at the present time? To what extent?

What is the area of Lake Tanganyika? Victoria Nyanza?

How do these lakes compare with Lake Superior in size?

CLIMATE.

Why is the climate of Africa more uniform than that of any other continent?

How far north does the tropical region extend?

What causes sea breezes to blow over Sahara in summer? Why is there no rain from these winds?

Why is the southern part of Africa cooler than the corresponding latitudes of the northern part?

What causes two rainy seasons in the equatorial regions?

In what part of Africa does rain never fall?

Into how many zones does Africa extend? Give the territory included in each.

What effect do the mountains have upon the climate? Why?

How do the Atlas mountains affect the climate of the Barbary States?

It is said that Egypt resembles southern California in climate. Give reasons.

Why is not the northern part of South America a desert like the northern part of Africa?

How does the climate of the different regions of South America compare with the corresponding regions of Africa?

How does the climate of the central part of Africa compare with that of central South America?

How have these conditions hindered progress in central Africa?

How many seasons throughout the greater part of Africa?

What can you say of the climate along the coast lines?

Where is the climate said to be deadly?

What is the cause of this condition?

Why is Africa the hottest of the continents?

What are the climatic conditions in the Sahara?

Where is the excessive rainfall of Africa and what regions are temperate and wholesome?

What is the climate of the northern part of Africa? Eastern? Central? Southern?

What are some of the controlling influences?

Is there a similarity of climate between the northern and southern parts of Africa?

VEGETATION.

How does rainfall affect vegetation?

What causes the dense vegetation of the Kongo basin?
 Where are the forest regions?
 In what section are the grazing lands?
 Why is the vegetation of Africa less varied than that of other continents?
 Give reasons for the abundant vegetation of northern Egypt.
 How far back does this condition date?
 In what part of Africa is agriculture carried on by means of irrigation?
 In what regions are the dense forests of Africa located?
 Where is the date palm found?
 What products would you expect to find in northern Africa? Southern?
 Eastern? Central? Why?
 With what vegetable products of Africa is the United States familiar?
 From what city are the best dates shipped? Figs? Olives?
 What other vegetable products are shipped to foreign countries?
 Name trees from which products of commerce are obtained.
 Is the soil of Africa as well adapted to cultivation as that of South America?
 How many kinds of palm trees and fruit are shown in the full-page illustration?

MINERALS.

How do the rock formations show that Africa has had fewer convulsions than the other continents?
 What are the most valuable building stones of Africa?
 How long have the granite and syenite of the Nile basin been known to the civilized world?
 In what other part of Africa are extensive deposits of granite found?
 Where are the iron and copper deposits? What skill have the natives in the use of these ores? Are the mines developed?
 What is known of the coal deposits?
 Where are the most important mining regions of Africa?
 Where are the noted diamond mines located?
 What has made Johannesburg a large and important city?
 Where is Kimberley? What has brought it into prominence?
 Has the mining of other common metals been developed to any extent in the south?
 What important mineral is found in the desert of Sahara?
 For what minerals are the Barbary States noted?
 What percentage of the world's supply of diamonds does southern Africa supply?

ANIMALS.

What is the most interesting feature of the animal life in Africa?
 Give a reason why the largest members of the animal kingdom are found in so many regions of Africa.
 What family of animals is spread over the whole continent?
 How many species of mammals are peculiar to Africa?
 How many species of the antelope family are found there?
 What is the most valuable bird of Africa?
 In what region is the camel found?
 What celebrated bird of commerce is found in Africa? Tell of the industry.
 In what regions are the large and fierce wild animals found? Name some of them.
 Do the animals of central Africa resemble those of central South America? Of Asia?

For what is the elephant hunted?

Name the domestic animals of Africa and the purpose for which they are used.

In what sections is stock raising pursued?

Name the animals and birds from which commercial products are obtained; give the name and value of same, and the countries to which they are sent.

Name the animals of Africa found in illustration and tell of the habits and peculiarities of each.

INHABITANTS.

What part of Africa has been the home of the white race for ages?

What parts have been the home of the colored race?

What region is peopled with a mixed race?

In what ways do the various tribes of the equatorial regions differ?

Refer to colored plate and give location of the various tribes illustrated.

What is peculiar about the iron and copper money (see illustration) used by the native Africans? About their head-dress?

In what regions is the negro found? What of their civilization?

What sections of Africa have been settled by the following nations respectively: Great Britain, Portugal, Holland, France, Germany, Spain and Denmark?

What nation has been the most active in the settlement of Africa?

What classes of people do we find in Egypt? What of the civilization of Egypt?

What is the result of British control in northern Egypt?

What is the history of the Dutch in southern Africa?

Where was the first settlement? What was their object?

Later what two settlements did they make farther inland?

What were these people called? Between these people and what other nation did war result? What was the cause?

How does the population of Africa compare with that of the other continents?

Where is the principal European population found?

In what region is the race known as the pygmies found? What are their characteristics?

What country in Africa is the home for freed slaves? What part did the United States take in the establishment of this republic? After what American President was its capital named?

What work was accomplished by the king of Belgium in the Kongo State?

Give some facts about the progress along commercial lines made in this state due to the work of Stanley and King Leopold of Belgium.

COMMERCE AND CITIES.

To what extent did Stanley open up the Kongo River to commerce?

What are the principal obstacles to overcome in regard to river commerce of Africa?

What are the usual means of transporting goods from the interior?

What nations are particularly interested in central Africa?

What are some of the reasons why we may look for commercial developments in this section?

What means of transportation employed in the Sahara Desert?

What is the general nature of the trade of Africa?

What is the largest city of Egypt? How does it compare with Chicago? St. Louis?

Alexandria is the seaport of what country? What is its size and what are the exports from this city?

What are the exports of Cape Town? Algiers? Tunis? By what means is Cape Town connected with the interior?

By referring to the Cape-to-Cairo Railway map, what would you say is the length of this line? How does it compare in length with the Trans-Siberian Railroad? With the distance between New York and San Francisco?

OCCUPATIONS.

Where is ostrich farming carried on? What is the value of this trade?

What occupations are followed in central Africa by the savages from which the outside world profits?

What can you say of the slave trade of Africa? What efforts have been made to suppress this?

In what sections of Africa is farming carried on? Mining? Trading? Stock-raising?

HISTORY.

What is said of the age of Egypt at the time the Roman empire was founded?

Was Egypt a prominent nation during Rome's zenith? What prevented the early exploration of the continent?

When and by whom was the Cape of Good Hope discovered? Who first sailed around it?

What additional accomplishment did Da Gama achieve twelve years later following the same course?

Was the continent circumscribed prior to the discovery of America?

What event led to the present interest in Africa?

When did Livingston begin his great work? How many years of his life did he dedicate to this work? When and where did he die? Who was delegated to follow up his work by the "Herald" of New York and the "Telegraph" of London? With what success?

Judging from the pyramids and tombs of Egypt, how many thousand years B. C. was this part of Africa inhabited?

Again, judging from the form of architecture and sculpture of that time, which were the more highly civilized, the people of those times or the people of some parts of interior Africa today?

PARTITIONING OF AFRICA.

When and for what purpose was the African International Association organized?

Who established the Kongo Free State?

Through what congress were the present political divisions of Africa made?

Since what time has the political development of the continent been rapid?

What has been the effect of the Boer War on British influence in Africa?

What important enterprises have resulted from this influence?

What is its effect upon the native tribes?

BOOKS OF AFRICA.

"Through the Dark Continent."

"The Congo and the Founding of Its Free State," and "Darkest Africa," by Stanley.

"Missionary Travels and Researches in South Africa," by Livingston.

"The White Man's Africa," by Bacon.

Divisions

- | | |
|---|--|
| <p>I. MATHEMATICAL GEOGRAPHY.</p> <ol style="list-style-type: none"> 1. Form. 2. Size. 3. Motions. 4. Measurements. 5. Longitude and Latitude. 6. Zones. 7. Map. 8. International Date Line. <p>II. PHYSICAL GEOGRAPHY.</p> <ol style="list-style-type: none"> 1. Land. <ol style="list-style-type: none"> a. Continent. b. Island. c. Cape. d. Peninsula. e. Isthmus. f. Mountain. <ol style="list-style-type: none"> Range. System. Volcano. g. Valley. h. Plain. i. Plateau. 2. Water. <ol style="list-style-type: none"> a. Hydrography. b. Ocean. c. Gulf or Bay. d. Strait. e. Movements. <ol style="list-style-type: none"> Currents. Tides. Waves. f. River. g. Lake. | <ol style="list-style-type: none"> 3. Atmosphere. <ol style="list-style-type: none"> a. Wind (map). <ol style="list-style-type: none"> Chinook. Monsoon. Sirocco. Kamsin. b. Rainfall. c. Storms. <ol style="list-style-type: none"> Tornado. Cyclone. Hurricane. d. Weather Bureau (map). e. Relation of climate to life. <p>III. POLITICAL GEOGRAPHY.</p> <ol style="list-style-type: none"> 1. Grand Divisions. <ol style="list-style-type: none"> (See outline Africa.) 2. Countries. <ol style="list-style-type: none"> (See outline United States.) 3. Minor political divisions. <ol style="list-style-type: none"> (See outline California.) 4. Cities. <ol style="list-style-type: none"> (See outline Boston.) 5. Forms of Government. 6. Religion. 7. Institutions. <p>IV. ECONOMIC GEOGRAPHY.</p> <ol style="list-style-type: none"> 1. Industries. 2. Commerce. 3. Manufactures. 4. Agriculture. 5. Mining. |
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Pacific Ocean

BOUNDARIES.	SIZE.	ISLANDS.	TRADE WINDS.
North.	Compared with Atlantic.	Single.	Direction.
East.	All the continents.	Groups.	Duration.
South.	Lake Superior.		Names of.
West.	Your own state.		

TEST QUESTIONS ON THE PACIFIC OCEAN.

- Who discovered the Pacific? When? What was its former name?
- How does the size of the Pacific compare with that of the four continents?
- With North America? With the Atlantic?
- What part of the earth's surface is occupied by this ocean?
- Name and locate three important groups of islands.
- In sailing from San Francisco to Manila, which island port would you visit?
- What distance is this from Manila?
- Name six of the principal seas connecting with it.

If Mt. Everest were set down in the deepest part of it, how many feet of water would cover its summit?

What is the difference in the tides of the Pacific and Atlantic?

Why are the trade winds of the Pacific irregular?

Describe a typhoon. Trade winds.

Who were the first Europeans to enter the Pacific?

Name some countries and cities touched by the Pacific Ocean which late events have given importance.

Table showing a comparison of the countries of South America with themselves, with Germany, with our own country and with Illinois.

Similar outlines can easily and readily be made by teacher or pupil on other continents, on countries, states, etc.

Country.	Area in square miles.	Population in round numbers.	Population per square mile.	Miles of railroads.	Principal products. Name five of each country.
Germany	208,000	56,000,000	270	35,000	
United States..	3,000,000	76,000,000	25	299,000	
Illinois	56,000	5,000,000	90	12,000	
Argentina	1,113,000	4,800,000	4	11,460	
Bolivia	734,000	1,800,000	2	700	
Brazil	3,200,000	18,000,000	5	10,480	
Chile	280,000	3,100,000	11	2,880	
Colombia	504,000	3,900,000	7	500	
Ecuador	116,000	1,200,000	10	186	
Guiana, British.	109,000	300,000	2	104	
Guiana, Dutch.	46,000	67,000	1	...	
Guiana, French.	30,000	30,000	1	...	
Paraguay	157,000	600,000	3	156	
Peru	695,000	4,600,000	6	1,146	
Uruguay	72,000	2,400,000	12	1,210	
Venezuela	593,000	930,000	4	634	

TEST QUESTIONS.

How does the size and population of French Guiana compare with your own county? What percentage of Guiana's population are convicts?

If Brazil's population should suddenly increase five times how would it compare with that of the United States? Which has the larger area?

Which has more miles of railroad, Brazil or Illinois? Brazil or your own state?

If Illinois were no more thickly populated than Bolivia what would be its population?

How many South American countries have a smaller population than New York City? Than Boston? Than Seattle?

What products and industries of certain South American countries are common to your neighborhood?

Two-thirds of the world's supply of coffee comes from what country of South America?

Why are there so few railroads in Bolivia?

Were you to take a trip through Venezuela, what products would you see?

What countries are crossed by the equator?

For how many thousand miles is the Amazon and its tributaries navigable? How wide is it near its mouth?

What wild animals would you find in the Amazon country?

Which has the colder climate, Buenos Ayres or Chicago?

Where would you find whole armies of monkeys?

Which is the larger, Great Salt Lake or Lake Titicaca? At what great altitude is the latter located?

In what mountain range of South America are found the second highest peaks in the world?

In what countries are there no railroads?

From page illustrating animals of South America, what would you say are the chief uses of the alpaca? Of what bird in Africa does the rhea remind you? Which is the larger?

In what respect would you find the farms of Argentina similar to those of North Dakota?

With what language should you be familiar to understand and be understood in Montevideo? In Rio Janeiro? In Valparaiso?

Are there any monarchies in South America? What is the prevailing form of government?

Which would be the shady side of a street running east and west at midday in Valparaiso?

Why would you find no shade on either side of a street running east and west in Quito?

In what direction would you look to see the sun at Buenos Ayres?

Methods of Teaching Geography

I. PURPOSES OF TEACHER.

1. To give knowledge.

a. Immediate surroundings; why?

Plants.

Animals.

Occupations, etc., etc.

b. Principles and laws of geography.

Climatic effects; what?

Distribution of life; results?

c. Application of laws.

Determining what conditions?

d. Observing these conditions.

Control human activities; how? when?

II. PREPARATION OF TEACHER.

1. Knowledge of what principles? Ability to apply how?

2. Knowledge of what facts? Specific and general?

3. Knowledge of methods of teaching.

III. AIDS TO TEACHER'S PREPARATION.

1. Study of what works?
2. Study of what related sciences?
3. Supplementary reading; what? object?
4. Observation; when, where and how?

IV. EQUIPMENT.

1. Collections of what? For what? How used?
2. Scrap cabinet. Consists of what? Purpose?
3. Miscellaneous. Individual ideas.

V. GRADES.

1. Primary.

- a. Nature study.
What subjects?
How presented?
- b. Facts and geographical conditions.
Observation. What? How? Where?
- c. Towns.
Occupations. What? Why?
Transportation. What? Why?
- d. Maps. What? How presented?
- e. Travel.
Imaginary journeys; object?
Extending ideas; known to unknown.

2. Intermediate.

- a. Text-book; adjustment of mind.
- b. Maps; of what? proportions?

3. Grammar.

- a. Advanced text-book; how used?
- b. Reference work, etc.

VI. GENERAL AIDS, ALL GRADES.

1. Study of type. How? What?

a. Comparisons.

Forms or outlines.	Races of men.
Distances.	Animals.
Surfaces.	Occupations.
Drainage.	Civilization.
Climate.	Growth and decline.

Guard well your spare moments. They are like uncut diamonds. Discard them and their value will never be known; improve them and they will become the brightest gems in a useful life.

Every book is a good book that sets the reader in a working mood. The deep book, no matter how remote the subject, helps us best.

—Emerson.

From my infancy I was passionately fond of reading, and all the money that came in my hands was laid out in the purchase of books.
—Benjamin Franklin.

Geology

In our general article on Geology in THE NEW PRACTICAL REFERENCE LIBRARY we treat of the origin of the earth, the formation of rocks, classes of rocks, the periods of geologic history, the so-called systems into which these periods are divided, and the present geological forces which are causing changes in the earth. From this article there are references to each of the twenty-eight periods and systems mentioned in the article; also to the articles on PHYSICAL GEOGRAPHY, DIKE, DIP, FOSSIL, FAULT, JOINT, which describe in more detail many of the features mentioned in the general article, GEOLOGY. The department also contains about 200 articles on mineralogy, including all the important rocks and earths, and some articles upon special phases of the subject, such as GEOLOGICAL SURVEY OF THE UNITED STATES, GLACIER, FOSSIL, MAMMOTH, ORE, PALEONTOLOGY, and an article on MINERALOGY.

OUTLINE.

- I. DEFINITION.
- II. THEORIES OF ORIGIN OF EARTH.
- III. FORMATION OF ROCKS.—Key to all life before man.
 1. Igneous Rocks—Caused by heat.
 2. Stratified Rock—Caused by action of water.
 3. Metamorphic Rocks—Those whose original composition has been altered on account of heat, chemical action, moisture or pressure.
- IV. GEOLOGIC PERIODS.
 1. Length or Extent.
 - a. Determined by studying the fossils found in different stone formations.
 2. Object.
 - a. To trace the development of vegetable and animal life by means of fossils of each stone period.
 3. Names.
 - a. Azoic or Archean—Forming of igneous rocks.
No form of animal life.
 - b. Protozoic—Rock formations—granite, marbles, slates.
Lowest forms of life appear as fossils.
 - c. Paleozoic—Appearing of continents.
Formation of coal measures.
Rich vegetation—age of coal plants.
Development of life from lowest forms to vertebrates.
Age of fishes, insects, scorpions, amphibians.

- d. Mesozoic—Formation of sandstone, chalk beds, gold, etc.
 Vegetation—Great variety, trees resembling our oak, birch, poplar, etc.
 Animals—Great variety, flying birds, reptiles, etc.
- e. Cenozoic—Continents nearly as they are now.
 Birds, mammals (milk-givers), etc.
 Snow, floods, ice, formation of caves.
 Age of man.

V. BIOGRAPHIES OF GEOLOGISTS.

Agassiz.	Dawson, J. W.	Hitchcock.	Murchison.	Smith.
Buckland.	Darwin.	Lamarck.	Owen.	Strabo.
Buffon.	Dana.	Le Conte.	Powell.	Thomson.
Cuvier.	Geikie.	Lyell.	Pythagoras.	Tyndall.
Dawson, G. M.	Hayden.	Miller.	Silliman.	Winchell.

QUESTIONS ON GEOLOGY.

What is geology? What is now the accepted theory as to the origin of the earth?

What proof have we that the interior of the earth is hot? Were the rocks of your neighborhood formed through the action of heat or water? Why your answer? What causes an earthquake? A volcanic eruption?

By a study of the colored plate of precious stones, what similarity do you see between the diamond and the opal? The turquoise? The amethyst?

What makes a hillside uneven and rough? What causes canyons?

Where does the soil come from? What is it? How formed?

Since the earth is being constantly worn down, what prevents it from being entirely immersed in the sea?

What is the difference between geology and mineralogy?

What are the seven varieties of marble? What is the difference between marble and granite?

What are some of the causes of the changes in the earth's crust at present? Cite some instances of change.

What are the uses of marble? Granite?

How is quartz used in the manufacture of porcelain?

What is amalgam?

What are some of the theories regarding the nature of the earth's interior?

How much fuel is required to smelt a ton of iron? How many hundred tons of coal per day is required to run a modern steamship? How many thousand tons to make a voyage across the Atlantic?

What is stratified rock?

By what means do we know the form of plant or animal life existing before man?

Which existed first, animals or plant? How do we know?

What is a quarry?

What is the difference between coal and diamonds?

What is the action of frost on rocks? What is the action of rain? Why?

What is the origin of the hills and mountains?

Where are the stratified rocks generally found?

What effect does ice have on rocks? Air?

Why do we sometimes find single rocks weighing many tons located on level farm lands?

How do waves change the seashore? What properties has water that it is able to decompose rocks?

What is a glacier? Where found? How formed? With what rapidity do they move? What effect would they have on surface?

What was the glacial period? What effects did it have on the earth?

What is the largest actual sum paid for a diamond? At what price is the stone now valued?

Of what element is the diamond the purest form?

For what do mining engineers use diamonds? Copperplate engravers?

What was the weight, cut and uncut, of the famous Koh-i-noor diamond?

What is the remarkable size of the Cullinan diamond found in 1905?

Are watch cases generally of pure gold? Give reasons for answer.

How does the ruby compare in value with the diamond? The emerald?

Where and how are pearls obtained?

For what are you indebted to graphite every time you pick up your pencil to write?

What is onyx? Where is it found? What have you in your home made from it?

CORRELATED SUBJECTS: Physical Geography; Dike; Dip; Fossil; Fault; Valley; Joint; Metamorphism; Erosion; Nebular Hypothesis; Glacier; Periods and Systems of Time; Canyon.

Gold

KINDS.

Pure gold

Jewelers' gold

Gold for coinage

GOLD FIELDS.

Australia

Peru

Bolivia

Ural Mountains

New Zealand

British Columbia

Klondike

South Africa

DISTRIBUTION IN UNITED STATES.

California

Colorado

Dakota

Idaho

Montana

Nevada

Alaska

TEST QUESTIONS ON GOLD.

What is gold? What is its value compared with silver? With copper? With brass?

To what remarkable thinness can it be beaten?

Would a wire made from an ounce of gold stretch from New York City to Des Moines?

How much heavier is gold than water? Than silver?

How does the production of gold in the United States compare with the value of the wheat crop? With the corn crop? The cotton crop?

How many carats denote pure gold?

How much copper is used in gold coinage?

Gold jewelry is made of what degree of fineness?

In what parts of the world is gold found? How is it obtained?

How is it extracted from sand and gravel?

Where was the chief supply of gold found before the discovery in California?

- What was the year of the gold fever in California?
 Is gold found in any of the United States besides California?
 How many hundred million dollars does the annual production of gold amount to?
 When were the Gold Fields of Australia opened?
 What kind of gold do dentists use in filling teeth?
 What is the earliest record before Christ of gold beating? Was the art known to Homer?
 What do gold beaters mean by a "cutch"?
 How many hours must gold be beaten before it will spread out?

Iron

- I. PROPERTIES.
 1. Ductility.
 2. Malleability.
 3. Hardness (tempering).
 4. Magnetism.
- II. COMPOSITION.
 1. Carbon.
 2. Silicon.
 3. Sulphur.
 4. Phosphorus.
- III. COMPOUNDS.
 1. Oxides.
 2. Sulphides.
 3. Chloride.
 4. Hydrates.
- IV. ORES.
 1. Kinds.
 - a. Red hematite.
 - b. Brown hematite.
 - c. Magnetite.
 - d. Spathic.
 2. Distribution.
 - a. United States.
 - Pennsylvania.
 - Virginia.
 - Adirondack Mts.
 - Lake Superior regions, etc.
 - b. Foreign Countries—
 - Russia, England,
 - Germany, Canada,
 - Austria, Spain,
 - Scandinavia.
- V. MINING ORE.
 1. Methods.
 - a. Blasting. Ore in form of ledge.
 - b. Steam shovel. When ore is soft.
2. Shipping.
 - a. Methods of loading and unloading ore vessels.
 - b. Ports.
3. Smelting—Object.
 - a. Crusher.
 - b. Blast furnace.
 - c. Manner of tapping, cooling, etc.
- VI. PIG IRON.
 1. Characteristics.
 - a. Rough.
 - b. Coarse.
 - c. Brittle.
 2. Uses.
 - a. Iron castings—Stoves, framework, etc.
- VII. WROUGHT IRON.
 1. Characteristics.
 - a. Soft.
 - b. Flexible.
 - c. Ductile.
 - d. Malleable.
 2. Uses.
 - a. Nails, wire, etc.
- VIII. STEEL.
 1. Characteristics.
 - a. Tough.
 - b. Hard.
 - c. Tenacious.
 - d. Gray in color.
 2. Uses.
 - a. Framework of large buildings.
 - b. Bridges.
 - c. Steel rails and ties.
 - d. Watches—Main-springs, etc.

IX. HISTORY OF THE INDUSTRY.

1. Ancient—Egyptians, Assyrians, Babylonians, Romans, Greeks, Iron Age.
2. Modern.
 - a. United States ranks how?

- b. England ranks how?
- c. Germany ranks how?

X. USES OF IRON IN MEDICINE.

1. Blood purifier.
2. Stimulates digestion.

QUESTIONS.

What is iron? Why are steel plants generally built near extensive coal beds?

Why does iron rust easily? What is rust? What kind of iron in your kitchen range?

Is there any other known metal that could be used for the same purposes as iron?

Which could you do without the better, gold or iron? Which constitutes the greatest factor in the world's progress?

Who was Krupp? Bessemer?

Why is coke used for blast furnaces?

What is slag? To what practical uses is it put?

Distinguish between pig iron, cast iron, wrought iron and steel. Name articles made from each.

What effect do repeated smeltings have on iron?

What can you say of the following: Carnegie, Schwab, Frick, Gates, etc.?

How did they handle iron in the iron age? What are some of the new uses of steel?

How much heavier is iron than water? For what purpose is pure iron used?

What is the name of the one continent which has no iron supply? Where is the best iron found in Europe?

How does the United States stand in the production of iron ore?

What is the method of mining iron ore?

How are the impurities separated from the iron?

How is a blast furnace operated?

In what is the molten iron cooled?

What does it cost per ton to transport iron from Duluth to Cleveland or adjoining ports?

EARLY USE OF IRON.

NOTE.—It has been a popular belief that iron was little known to the ancients, but Lepsius believes that the Egyptians used it for hand instruments, and that it was prepared in smelting furnaces 3000 B. C.

An iron band was found in an inner part of the Pyramids of Cheops, where the ancient architect had placed it not later than 2800 B. C.

In the tombs of Thebes and Memphis tools and other articles of iron have been found, some of which are among the treasures of the New York Historical Society.

Iron was so valued that it was seized as plunder by the victorious soldiers. An iron sickle was found beneath one of the sphinxes at Karnak, and iron was used for the door frames of the temple of Ptah. A piece of pure iron was found beneath the obelisk that now stands in Central Park, New York, when it was taken from its original position on the banks of the Nile.

The relics found show that the art of tempering was known at an early date. The Egyptians worked mines in the desert region of the south between the Nile and the Red Sea, and also near Mount Sinai in Palestine. The ruins of extensive iron works were found in 1873 near the Wells of Moses.

What makes steel valuable?
 What is pig iron used for? Wrought iron?
 When did iron come into general use?
 Where in the Bible is the first reference to iron?
 When was iron discovered in the United States?
 When were the first iron works built in the United States?
 Who introduced the use of anthracite coal for smelting?
 What country leads the world in the iron and steel manufacture?
 Which country is next in line?
 How much fuel is required to smelt a ton of iron?
 How is iron used in medicine? What effect does it have on the health?
 What is meant by the "iron age?"
 What is the leading iron-producing state?
 Correlated subjects—Blast furnaces, steam shovel, rolling mills, Bessemer steel, flux.

Mining

- I. DEFINITION.
 1. Mining proper.
 2. Metallurgy.
 - a. Separating metals from their ores.
 - II. DEPOSITS.
 1. Beds or seams.
 2. Veins or lodes.
 - III. MACHINERY.
 1. For beds or seams of ore, shaft is sunk.
 2. For veins or lodes, vertical shaft is sunk.
 3. Sinking of shafts.
 - a. Blasting, etc.
 - b. Drill of steel driven by steam or electricity.
 4. Machinery for hoisting, crushing, separating, etc., dependent on kind of mines.
 - IV. WORK INSIDE OF MINE.
 - V. SHIPPING.
- Correlated subjects: See All Metals.

MINING.

GOLD.

(Also see Outline.)

How many carats fine is pure gold? Jewelers' gold? Standard gold for coinage?

Why is it necessary to combine gold with some other metal before using? What is the baser metal called?

Are watch cases generally of pure gold? Give reasons for answer. How does the United States rank as a gold producing country?

In what condition is gold found, and where? What other metals does gold unite with to form an alloy?

Describe processes of separating gold from its impurities. By whom are the assay offices established, and where?

SILVER.

Give uses of silver. Is it ever used as a medicine?

What are its characteristics? What effect has the air upon it?

Where are the silver mines of the United States, Mexico, and South

America? What percentage of the world's supply does the United States produce?

With what other ores does silver readily unite?

What is meant by the standard silver dollar? When did this come into use?

COPPER.

In what forms does copper occur in the earth and what other metals are found in copper ore?

What percentage of the world's supply does the United States produce, and where are the important copper producing sections?

Give processes of extracting copper from the ore.

An important use of copper is in connection with what industry?

What are some of the household uses of copper?

IRON.

(See outline.)

LEAD.

What are some of the characteristics of lead? What other metals are sometimes obtained from lead ore?

What is white lead and for what is it used?

Give practical uses of lead along all lines. What is lead poisoning?

Why is lead so expensive?

What country stands first in the production of lead?

SULPHUR.

Describe sulphur. What form does it take as a mineral?

In what regions is it generally found?

What percentage of the supply of sulphur is made into sulphuric acid? What are the uses of this acid?

How is sulphur used as a medicine? As a household help?

What country leads in the production of sulphur?

COAL.

In what position or form is coal found in the earth? Why do we know coal is of vegetable origin?

By what means is it reached?

What is meant by the term "firedamp?" How is a coal mine ventilated?

Where are the principal coal mines of the world?

What do you know of the miners and their lives? Who is John Mitchell?

Always read the preface to a book. It places you on a vantage ground and enables you to survey more completely the book itself.

In science, read by preference the newest books; in literature, the oldest. The classic literature is always modern.

—Bulwer-Lytton.

Coal

I. FORMATION.

1. Decayed vegetation.
 - a. Pressure.
 - b. Heat.
2. Upheavals and depressions.
3. Coal measures.

II. VARIETIES.

1. Anthracite.
2. Bituminous.
 - a. Cannel.
3. Lignite.

III. DISTRIBUTION.

1. Europe.
2. Asia.
3. Africa.
4. America, etc.

IV. PRODUCTION.

1. United States.
2. Great Britain.
3. Germany, etc.

V. HISTORY OF THE INDUSTRY.

FORMATION.

What is coal?

How is it formed? What kind do you use in your home?

How are the veins separated from one another?

What means have we of knowing the sort of vegetation from which coal was formed?

How is it possible to know the number of upheavals and depressions which took place in the formation of the coal?

What is meant by the coal measures?

What did the vegetation of the coal period include?

What was the height of the ferns?

VARIETIES.

According to its hardness how is coal divided?

Which is the best variety of coal? Is it found near the surface or deep in the earth?

Where are the largest mines of this variety? For what is it generally used?

Does it produce smoke in burning?

Which variety is known as soft coal?

What causes the dense black smoke in burning soft coal?

Where are the great fields of this coal found? What are its important uses?

Describe cannel coal. For what is it especially desirable? Why is it very expensive?

Where is lignite coal found? How does it compare in age with other varieties?

Why is it useless for manufacturing purposes? In what state is it valuable for fuel?

DISTRIBUTION.

What are the leading coal producing countries of Europe?

Which country has the most extensive fields?

What country in Asia is supposed to have the most extensive coal fields in the world? What about their development?

What part of Africa contains coal fields?

Tell about the coal fields of Australia and the neighboring islands.

One hour a day profitably employed in reading would enable any person of ordinary capacity to master a complete science. One hour a day would make an ignorant man a well informed man in ten years.

History

HISTORY, in the true sense of the word, is a great deal more than mere dates and names; it is more than a fascinating story, since it fills the reader with reality. Take, now, your school history and supplement the lessons which it contains with readings from THE NEW PRACTICAL REFERENCE LIBRARY, and the dull, dry parts will become illuminated and the task of your study periods will develop into a recreation.

In THE NEW PRACTICAL REFERENCE LIBRARY is a general article on HISTORY, in which the three meanings of the term are described: history as a subject of study, history as a branch of science, and history as a branch of literature. Under the first head the spirit, content or meaning of history is shown; under the second, the materials with which historians deal and the methods by which they work are described. The division of history into periods, ancient, medieval and modern, is also discussed. Under the last head a list of the principal histories, from the time of Herodotus to that of Rhodes, is given. A reference in this article is made to the article HISTORY—METHODS OF TEACHING, which follows it.

In the article HISTORY—METHODS OF TEACHING, the purposes of historical instruction are named, with suggestions as to the time and place for emphasizing each of them; the preparation of the teacher is discussed and, finally, specific methods of teaching history in the primary grades, intermediate grades, and grammar grades are described, including lists of books peculiarly adapted to the work of each of these grades and for the assistance of the teacher.

The history of each nation is given in a subhead of the article upon that nation. These subdivisions contain numerous references to the histories of other nations, as well as to other articles upon important wars, battles, political events of sufficient importance to be known by distinctive names, such as CONGRESS OF VIENNA, BAREBONES PARLIAMENT, and others; treaties; famous documents; temporary systems of government, such as the commonwealth and the directory; great institutions, such as the feudal system and chivalry, and important special periods, such as the Dark Ages, the Middle Ages, etc. Frequent reference is also made to the biographies of famous individuals, and in a few cases general discussions of the periods in which they lived are given under their names; this is true of Napoleon and Cromwell. The history of the United States from the discovery of America is contained in a long article which forms a subdivision of the article UNITED STATES. This is subdivided by periods and contains frequent references to a great many other articles, such as those upon battles and wars, famous laws, treaties, congresses, documents and organizations. Among these titles are such as the following: THE ALABAMA; ALBANY CONVENTION; ANTIETAM, BATTLE OF; ANTI-FEDERALISTS; BACON'S REBELLION; BERING SEA CONTROVERSY; BLACK FRIDAY; BON HOMME RICHARD; BOSTON

MASSACRE; CARPET-BAGGERS; CHARTER OAK; CHINESE EXCLUSION ACT; CINCINNATI, SOCIETY OF THE; CLAYTON-BULWER TREATY; CONFEDERATE VETERANS, UNITED; CONGRESSIONAL RECORD; COXEY'S ARMY, etc. The article upon each of the states contains a comparatively brief history of the state. The department of American biography is exceptionally large. Reference is made to it from almost every historical article. Under the name of each president the principal events of his administration are enumerated.

OUTLINE.

- I. GENERAL ARTICLE.
 1. As a subject of study.
 2. As a branch of science.
 3. As a branch of literature.
 - II. HISTORY, METHODS OF TEACHING.
 1. Purposes.
 2. Preparation of the teacher.
 3. Primary grades.
 4. Intermediate grades.
 5. Grammar grades.
 - III. FOREIGN HISTORY.
 1. Ancient.
 2. Medieval.
 3. Modern.
 4. National—Under titles of nations.
 5. Most important wars and battles—In separate articles.
 6. Important political events, such as treaties, congresses, documents, systems of government, institutions and periods—In separate articles.
 7. Biographies.
 - IV. UNITED STATES HISTORY.
 1. General article—In article UNITED STATES.
 2. State histories—Under separate states.
 3. Battles and wars.
 4. Political events, such as laws, treaties, congresses, documents and organizations.
 5. Biographies.
- ANCIENT—476 A. D. (Before the fall of Rome.)
- Assyria and Babylonians.
 - Egypt—Geography of, Nile.
 - Hebrews—Israelites or Jews.
 - Persians—Fall of, Cyrus, Cambyses.
 - Greece—Pericles, Alexander the Great, Macedonian Empire, Xerxes.
 - Rome—Cincinnatus, Gauls, Carthage, Triumvirs.
 - Barbarian tribes.
- MEDIEVAL—476 A. D.—Sixteenth century. (From Rome to America.)
- Saracens—Mohammed, Hegira, Koran.
 - Italy—Lombardy.
 - Byzantine Empire—Justinian, The Greek Church.
 - France—Charlemagne.
 - Germany—Invention of printing.
 - Spain—Castile and Aragon, Grenada.
 - Portugal—Prince Henry, Diaz, Vasco da Gama.
 - England—Teutons, Alfred the Great, William the Conqueror.

MODERN—Sixteenth century. (Down to modern times.)

England—Elizabeth, Stuarts, Ireland, Victoria, Gladstone.

France—Louis XV.

Germany—Luther, Reformation.

Scandinavia—Christian II., Gustavus, Ivan.

Italy—Papacy, Cæsar, Raphael.

Spain and Portugal—Philip II., Inquisition, Armada.

Russia—Peter the Great.

America—United States, Mexico, Cuba.

I. MEANING.

1. Events, forces and institutions denoting a nation's character and progress.
 - a. Social.
 - b. Industrial.
 - c. Intellectual.
 - d. Religious.
 - e. Political.
 - f. Influence of individuals.
2. Science which studies these conditions.
 - a. Ruins, buildings, implements.
 - b. Laws and documents regarding government.
 - c. Art and literature.
 - d. Contemporary writings.
3. Branch of literature in which these conditions are discussed.
 - a. Earliest and greatest writings—Myths, traditions, etc.; valued for their literary merit rather than historical facts.
 - b. Modern writings—Narration and search of truth without partiality.
 - c. Other social sciences based upon it in regard to data, etc.

II. DIVISIONS.

1. Ancient—
 - a. Struggle toward universal unity in thought, politics and religion.
 - b. From primitive times to Charlemagne.
2. Medieval—
 - a. Confusion of ancient ideals of universal unity and supplanted by extreme individualism.
 - b. Extended to middle of fifteenth century, Fall of Constantinople.
3. Modern—
 - a. Idea of nationality carried into all questions.
 - b. Up to present time, including United States history.

QUESTIONS—MONROE DOCTRINE.

What is the Monroe Doctrine?

Under whose administration was it formulated?

What led to its formation?

When was this doctrine first invoked, and against whom?

When and for what reasons was the doctrine once disregarded?

What did this finally bring about for the benefit of the United States?

When did Mexico benefit greatly by it?

What was President Hayes' stand in regard to its enforcement? President Cleveland's?

Methods of Teaching History

- I. PURPOSES.
 1. To present facts in such a manner that the principles of growth and government of nations will be established.
 2. To stimulate patriotism and all its attendant virtues.
 3. To develop the minds of pupils to imagine and grasp a situation.
 4. To train the judgment and reasoning powers.
 5. To direct the reading of pupils along supplementary lines and create a permanent choice for historical reading.
 6. To strengthen and develop character.
- II. PREPARATION OF THE TEACHER.
 1. A thorough knowledge of subject.
 2. A knowledge of methods of teaching.
 3. Ability to direct pupils in study.
 4. Ability to present subjects in an interesting manner.
- III. PRIMARY GRADES—FIRST, SECOND AND THIRD.
 1. History stories.
 2. Biographies of great men.
 3. Stories of exploration.
 4. Patriotic songs and gems of literature.
- IV. INTERMEDIATE GRADES—FOURTH, FIFTH AND SIXTH.
 1. History stories.
 2. Biographies.
 3. Stories of travel.
 4. Memorizing patriotic songs and gems.
- V. GRAMMAR GRADES—SEVENTH AND EIGHTH.
 1. Text-books.
 2. Cause and effects.
 3. Maps.
 4. Outlines.
 5. Dates.
 6. Government.
 7. Wars.
 8. Supplementary work.

flags

- I. GENERAL MEANING OF TERM.
- II. USES.
 1. Primary.
 - a. An emblem representing principles of government on all public occasions.
 - b. To distinguish nations on land or sea.
 2. Secondary.
 - a. To distinguish divisions of army in war.
 - b. To denote rank of officers in army and navy.
 3. Signs or signals.
 - a. Yellow flag—Quarantine.
 - b. White flag—Flag of truce.
 - c. Flag reversed—Sign of distress.
 - d. Lower flag—Act of respect to superior officers.
 - e. Half mast—mourning.

- f. Signaling at sea—Code for each nation.
- g. Dipping flag—Salute.
- h. Powder on board—Red.

III. FLAGS OF NATIONS.

1. United States.

- a. Origin.
- b. History of.
- c. Birthday of Stars and Stripes.
Meaning of.
Stars—how and where placed?
Stripes—why alternate red and white?
Construction of.
Additional stars when?
Permanent arrangement of stars and stripes.

d. Kinds.

- President's.
- Admiral's.
- Vice admiral's.
- Rear admiral's.
- Commodore's.
- Revenue.

2. Foreign countries.

- a. England.
- b. Spain—red and yellow.
- c. Germany, etc.

IV. INFLUENCES.

- 1. Flag Day.
- 2. Flag on all school houses.
- 3. Patriotism, etc.

QUESTIONS—FLAGS.

Were you to see a United States warship, how could you determine the rank of the officer in charge?

What flag was hoisted on Dewey's flagship in the battle of Manila Bay? Were he to command another vessel or fleet today, would the same kind of flag be hoisted?

Describe the flag displayed by Paul Jones in 1779.

Oklahoma has recently been added to the sisterhood of states; from what day after her admission was a new star added to the flag?

Who made the first American flag? Which navy first saluted the American flag?

What was the first recorded naval engagement under the flag? When were the colors first unfurled over a foreign country?

When was the flag first seen at a British port? What was the national emblem during the War of 1812?

Who wrote "The Star-Spangled Banner?" Who has the flag that inspired that song?

When did the flag have sixteen stars and fifteen stripes?

Why has our flag thirteen stripes? Who suggested the number of stripes?

When was the revenue flag created?

What was the Confederate flag like?

What is the color of the president's flag?

What flag is hoisted when powder is taken on board?

What is the color of the quarantine flag?
What is the meaning of a flag reversed?
What is the flag of truce? What does the expression mean, to "strike the flag?"
How are flags hoisted in case of mourning? What is "dipping the flag?"
When and why have stars been added to the flag?

Washington

BIRTH—Virginia, February 22, 1732.

PARENTS—Well-to-do farmers.

EDUCATION—Limited to elementary subjects. Acquired by self-study a fine knowledge of mathematics and surveying and knowledge along general lines.

PROFESSION—Public surveyor.

MILITARY CAREER—Began at age of 19. Won admiration and respect in an eminent degree in contest with French and Indians.

REVOLUTION—Prior to Revolution he sympathized with the patriots, but counseled moderation and urged war as last resort. 1774—Elected to Continental Congress and chosen commander-in-chief of the American forces. Served throughout Revolution. Details of his campaign constitute story of Revolution. Rare skill and patience brought results.

PRESIDENT—1787. Chosen as president. Served two terms. Solved some of the most important problems ever presented to American government.

1. Adjustment of important diplomatic difficulties with England and France.
2. Establishment of a national mint.
3. Chartering of the first bank of the United States.
4. Assumption by the government of the national debt.
5. Admission of certain states.

MARRIAGE—1759. Married Mrs. Martha Custis. From the close of French and indian wars to Revolution managed his estates and became one of the wealthiest men in United States.

CHARACTER—Thoughtful and studious nature. Rare tact and judgment. "First in war, first in peace, and first in the hearts of his countrymen."

DEATH—1799. Death occurred from illness brought on by long exposure in the saddle.

BURIAL—Location.

"The preservation of the sacred fire of liberty and the destiny of the republican model of government are justly considered as deeply, perhaps as finally, staked on the experiment intrusted to the hands of the American people."

—From Washington's First Inaugural Address, April 30, 1789.

Thirteen Colonies

School work too frequently is a monotonous grind to the teacher as well as the pupil. A little variety in the way of illustrative work, outline work, queer queries and other devices can be used successfully in connection with almost every subject and will inspire the pupils and change what otherwise might prove drudgery to the teacher into a happy milestone. To get away from the ordinary we suggest that the teacher this year in the study of the Thirteen Colonies have a chart prepared as outlined for the Administrations.

We present you herewith a suggestive chart for the study of Massachusetts and one quite as interesting can be made for each colony. The supplementary material furnished by the NEW PRACTICAL REFERENCE LIBRARY added to the information supplied by the regular text will enable any one to prepare interesting work.

The hundreds of questions suggested by the illustrations will keep the pupils busy and the answers will furnish the groundwork for a thorough understanding of this period of our history. The chart is not supposed to contain the information to answer the questions so much as to suggest the questions and prove a nucleus for memorizing answers.

SUGGESTIVE QUESTIONS.

- Why was the (Cradle of Liberty) so styled?
- When was the first printing press set up in America?
- What was the first newspaper published in America?
- Who was the first settler of Boston?
- What city is known as the Hub of the Universe?
- Why was Boston styled "The Athens of America"?
- For what was the Boston Elm noted?
- What was the sobriquet of Faneuil Hall?
- Name two causes of Salem witchcraft,—three events, two results?
- What was some of the early money used in Massachusetts?
- What was the nature of the government established by the Pilgrim Fathers?
- In what ship did they come to America? What was the number of emigrants? How many houses were erected by them?
- What now marks the place where the Pilgrims landed?
- Why were the persons who come over in the Mayflower styled Pilgrims?
- Who were among the leaders of the Pilgrims? Who the first governors?
- What do you know of their growth? Their sufferings? Their independence?
- What inscription is upon the original Plymouth Rock?
- Who is the author of the poem written in honor of the landing of the Pilgrim Fathers?

The books which help you most are those which make you think the most. The hardest way of learning is by easy reading; every man that tries it finds it so.

M A S S A C H U S E T T S



PLYMOUTH ROCK

*"What sought they thus afar?
Bright jewels of the mine?
The wealth of seas? the spoils of war?
They sought a faith's pure shrine."
Oastons.*

*Times - Dec. 21, 1620.
Place - Plymouth.
Why so named?
People - Pilgrims.
Leaders - Bradford-Barnes.
Character - Industrious
Wandering!
Number - 102.
No. of families - 19.
Shipping
Object - Religious freedom.
Date - Mayflower
No. of houses - 20
Governors - Carver-Bradford.
First Thanksgiving
Growth - Very slow
Independence*

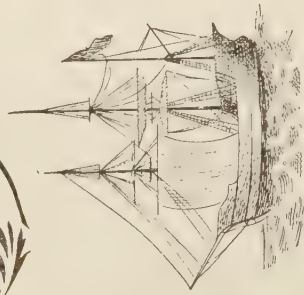


SALEM WITCHCRAFT

*Time - 1692
Place - Salem, Mass.
Cause
Belief - possession of the Devil.
All churches to do his bidding.
Events
Prisons filled.
Many fastened into confusion.
Twenty put to death.
Results
Shook the reputation of the times.
Increased the spirit of intolerance.*



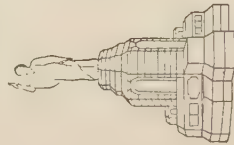
ELM TREE



MAY-FLOWER



HUB OF THE UNIVERSE



PILGRIM MONUMENT



PINE TREE SHILLING



FANEUIL HALL
"CRADLE OF LIBERTY"

Roach



The Administrations

How many times have you taken your class over this period of the History? How many of them can name three events of each administration? How many can tell in whose administration the war of 1812 occurred? The Embargo Act? The purchase of Louisiana? The admission of Texas? The Panic of 1873? The Omnibus Bill? The completion of the Atlantic Cable? The Thirteenth Amendment? The erection of Liberty Enlightening the World? The many other interesting events which concern the most important period of American History?

Why not make an exception this year? Why not do something special? Why not get out of the rut of text-book routine? The History class will devote half of the six months' term to this period of History. You may have nine pupils in this class. Make twenty-seven charts—one representing each administration. That means that each pupil must make one chart per month to complete the series. Have a cabinet maker or one of your pupils prepare a stand after the fashion of the illustration, secure twenty-seven sheets of cardboard 12x18 inches for permanent charts. Secure a supply of common paper for rough sketches to be used in the daily recitation. After outlining to the pupils what you expect them to accomplish during this time—that during the three months they are not only to become familiar with the most important period in American History but that they will leave a monument of their finishing work in History that will be prized by succeeding teachers as well as pupils and will prove a more practical chart than the machine-made charts which cost so dearly.

Require each pupil to sketch with pencil everything that suggests itself of interest in Washington's administration and bring to the recitation the next day, compare notes, make suggestions and develop on the blackboard an ideal arrange-

ment. In this manner design an administration each day for nine days, each pupil will then be assigned a special chart to prepare, the selection can be made by casting lots. During the remainder of the first month spend the recitation period in completing and perfecting the charts assigned and see that nine effective charts are produced illustrating well the important events of the first nine administrations.

These charts should then be attached to the support by a cloth hinge, a neat cover design should be supplied. The next few recitations should be devoted to a review of the work accomplished, fixing permanently in the minds the important events illustrated. We supply a list of suggestive questions which may be asked concerning Johnson's administration, all of which information is supplied from the chart and should be answered with the chart before the class but not open to this administration. After this review the chart should be opened to Johnson's administration and the illustrations carefully studied. This should be continued for each administration and the interest created and the information secured will amply repay any efforts made by the teacher. These special accomplishments are the distinguishing features between the successful and non-successful teacher. The page illustration is simply suggestive of one administration and we have selected one of the least eventful, so that the teacher may not feel that she will have any trouble in having ample material for this work. The wealth of material supplied by the NEW PRACTICAL REFERENCE LIBRARY is apparent and it is merely a question of a wise selection.

What were the three important features of the President's idea of reconstruction?

What additional requirements were imposed by Congress?

What is an appropriate epitaph for Lincoln's tomb?

In what year was Nebraska admitted into the Union?

What immense domain was added to the United States during this administration?

Name four important laws passed while Johnson was President?

How many men took part in the Grand Review? How long did it last?

How did the soldiers march? When did it occur?

What ended the dream of French dominion in the New World?

The northern office seekers who went South at the close of the Civil War were designated by what title?

What two words express the thought of the Thirteenth Amendment? Of the Fourteenth?

What vessel was used in successfully laying the Atlantic Cable? Name some interesting facts as to the size of the vessel? The successful accomplishing of this enterprise was due to what personage?

Independent thinking has given us the present, and will forever continue to make tomorrow better than today. The right to think is inalienable, or man is a machine; thought is life, or the human soul is a thing. —Patrick.

1865

1869

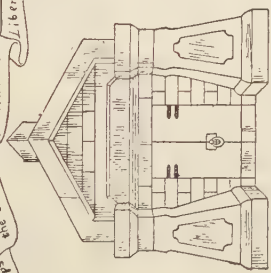
JOHNSON'S ADMINISTRATION

1862-1867

France declares war.
Unionian ruler.
United States protest
Thomson's doctrine
Thomsonian shot
End of French dream



Human Rights
Liberty



LINCOLN'S TOMB



GRAND REVIEW
June 9, 1865
Held at Washington
Grandest military display ever
held in America.
Soldiers marched to abreast
200,000 men took part
Lasted two days



NEBRASKA
ADMITTED 1867

From whom?
Time
Price
Area.

RECONSTRUCTION
President at 100 of Success
1. Reconstruct. District
2. Reconstruct. District
3. Reconstruct. District
Congress
1. Reconstruct. District of Success
2. Reconstruct. District of Success
3. Reconstruct. District of Success

Paris
Fradman's Bureau
Civil Rights
Terror of Offenses
Amnesty

Amendments
XIII
Anti Slavery
XIV
Equal Rights



GREAT EASTERN

Launching lasted nearly 5 mo. Cost 60,000 £
Length 680 ft Breadth 118 ft Height 70 ft Launched 1868
8 Engines 11,000 Horse power Sailed 1885 for \$126,000

ATLANTIC CABLE

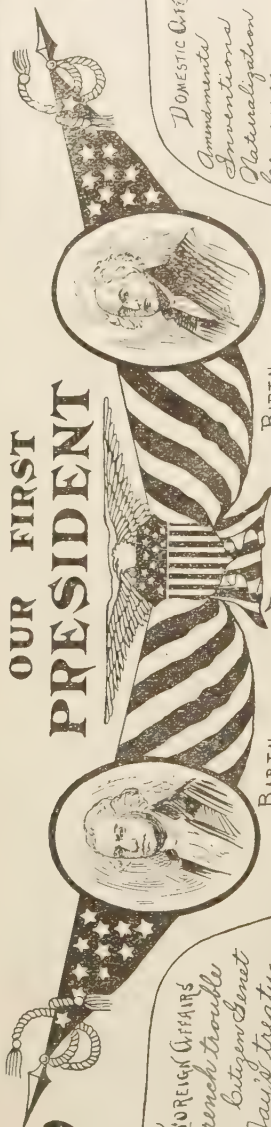
Success due to energy of
Cyrus W. Field
1857 First attempt Cable parted
1865 Second attempt Success
1866 Great Eastern successfully accomplished the work.

Reed

OUR FIRST PRESIDENT

1789

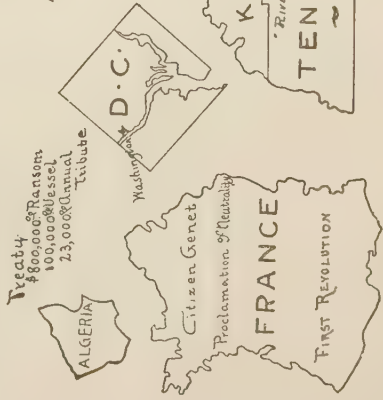
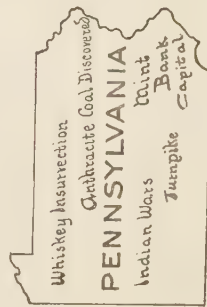
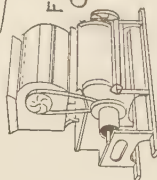
1797



BIRTH
 PARENTAGE
 EDUCATION
 MARRIAGE
 CHARACTER
 DEATH

BIRTH
 PARENTAGE
 EDUCATION
 MARRIAGE
 CHARACTER
 DEATH

MISSISSIPPI RIVER



Treaty
 \$800,000 Ransom
 100,000 vessel
 23,000 annual tribute

OPENTO COMMERCE 1796

"Providence left him childless, that his country might call him father."

In a library of fifty, or even thirty, well chosen volumes you may possess infinite riches, and means for a lifetime of enjoyment.

Law and Politics and Business

All men should know as much of the ordinary law as protects their common and universal rights, a general understanding of how to make agreements, conduct sales, draw notes, and such principles of business law will prevent, every day, important mistakes leading to loss. Our course gives one a valuable foundation for the understanding of these questions, and ought to be mastered by every teacher and every student of sufficient age to understand business transactions. It deserves, indeed, a place in every household.

Law

I. CLASSIFICATION.

First Classification:

1. International law.
2. Constitutional law.
3. Administrative law.
4. Special classes.
 - a. Roman.
 - b. Civil.

c. Salic.

d. Commercial.

e. Parliamentary.

Second Classification:

1. Common law.
2. Equity.
3. Statute.

II. ADMINISTRATION.

1. Procedure.
2. Offenses and punishments.

III. LAWS CONCERNING SPECIAL RELATIONS.

1. Husband and wife—Marriage; Divorce.
2. Parent and child.
3. Master and servant.
4. Landlord and tenant.

IV. MISCELLANEOUS LEGAL TERMS AND USAGES.

The general article LAW contains the two classifications shown in the outline, with a statement or definition of each. Besides this, there is a long article on INTERNATIONAL LAW, with reference to other important departments, such as WAR; NEUTRALITY; TREATY; DIPLOMACY; MONROE DOCTRINE; PEACE CONFERENCE; INTERNATIONAL, etc. There are also articles on each of the special classes shown in the outline, and comprehensive articles on COMMON LAW; EQUITY and STATUTE, showing the evolution of each.

Besides a long article on PROCEDURE, which shows the exact order and significance of the steps in bringing a case to trial, there is an article on COURTS, including classification; one on JURY; and TRIAL BY JURY, and many others upon minor topics, such as APPEAL; WRIT; EVIDENCE; BAIL; WITNESS; WARRANT, etc. Most of these are referred to in the longer articles so that they are easily found.

Besides an extensive article on CRIME, there are briefer articles on all of the

important ones, from MURDER to BLACKMAIL, ARSON and ASSAULT AND BATTERY, in each of which the distinguishing features are shown as clearly as possible, and the usual punishments. Frequent references are made to separate articles on punishments, crimes and remedies for other offenses, including CAPITAL PUNISHMENT, DAMAGES, PRISON, FINE, etc. The special relations noted in the outline are covered by long articles, the fourth, or the relation of landlord and tenant, being placed under the titles TENANT and LEASE. The others have the titles given.

The division called in the outline MISCELLANEOUS LEGAL TERMS AND USAGES includes a great variety of titles frequently referred to in the other articles mentioned, but also of interest and value in themselves. Among the titles are ESTATE; REAL PROPERTY; PERSONAL PROPERTY; BANKRUPTCY; ATTAINDER; COPYRIGHT; PATENT; WILL; DESCENT; PENSIONS; HOMESTEAD LAWS, and others.

Government

- I. FORMS.
- II. BRANCHES AND DEPARTMENTS.
- III. OFFICES AND TITLES.
- IV. ACTIVITIES, PROBLEMS AND RELATED TOPICS.

In the article GOVERNMENT, the classification of government is given. The most important kinds are given separate articles also, and the variations in the governments of different countries are given in the articles upon those countries.

Articles are devoted to the three branches of government—executive, legislative and judicial, and special articles to subdivisions of the former. Referred to from Government, governmental theories are discussed under the article State. Many offices and titles used in speaking of government are described in separate articles, and all of the most important ones are so given. In the last division of this branch of the subject, such questions as CIVIL SERVICE AND CIVIL SERVICE REFORM; COLONIES AND COLONIZATION; THE CONSTITUTION OF THE UNITED STATES; DEAD LETTER OFFICE; NATIONAL DEBT; DIVINE RIGHT OF KINGS; LANDS, PUBLIC; MUNICIPAL GOVERNMENT, are included.

Commerce

- I. FORMS.
- II. INSTITUTIONS.
- III. USAGES.

Under the subject COMMERCE the important terms and institutions are described in separate articles, besides being generally outlined in the article COMMERCE. Among the subjects discussed which, from their nature, must be handled independently are INSURANCE; BANKS AND BANKING; CLEARING HOUSE; AGENCY; CARRIER, COMMON; CONTRACTS; CORPORATION; CREDIT; JOINT STOCK COMPANIES; NEGOTIABLE INSTRUMENTS; PARTNERSHIP; SAVINGS BANKS; BOARD OF TRADE; COMMERCE, CHAMBER OF; ADVERTISING; ANNUITY, and many related topics.

What is commerce?

When did it lead to the development of the merchant? At what time did its growth necessitate markets and fairs?

Describe first means of commerce: Mode during Middle Ages. Effect of Crusades on commerce.

When did trade between nations begin to assume its present world-wide importance? To what two causes was this impetus due?

How did advancement in the science of navigation lead to an increase in the world's commerce?

Why did the restriction of commerce between European nations and their colonies prove unprofitable?

What acts restricted the commerce of the American colonies before the Revolutionary War?

To what great event in the history of our country did this lead?

From what year does the commerce of the United States as a nation date?

First decade:

a. Amount of imports.

b. Amount of exports.

When did our commerce begin to develop rapidly?

Which is greater, the internal or foreign commerce of the United States?

Reasons for this:

a.

b.

c.

d.

How does our internal commerce compare with that of other countries?

What period of time has been remarkable for commerce development?

How did the imports and exports of the United States for 1905 compare with those of France? Of Germany? Of Japan?

Through what waters would a cargo of wheat pass in going from Duluth to Constantinople?

Name two products of your own county exported abroad.

Related Subjects (which see).

a. Chamber of Commerce.

b. Department of Commerce and Labor.

When organized.

Duties.

c. Commercial education.

Sociology and Economics

I. POLITICAL ECONOMY.

II. INDUSTRIAL AND SOCIAL PRINCIPLES, INSTITUTIONS AND MOVEMENTS.

The subject of **POLITICAL ECONOMY** is outlined fully in a long article under this title. From this, references are given to important divisions of the subject and to some common terms, such as **CAPITAL**; **INTEREST**; **WAGES**; **RENT**; **TAX**; **VALUE**; **POPULATION**; **STATISTICS**; **MONEY**; **GRESHAM'S LAW**, and others. The second division of the subject is briefly outlined in the article **SOCIOLOGY**, from which references are made to a great many related topics, such as **ANARCHISTS**; **COMMUNISM**; **COÖPERATION**; **FACTORY AND FACTORY LEGISLATION**; **ILLITERACY**; **IMMIGRATION**; **LABOR ORGANIZATIONS**; **MONOPOLY**; **GEORGE JUNIOR REPUBLIC**; **SOCIAL SETTLEMENTS**; **TRUSTS**; **WOMAN'S RIGHTS**; **CONVICT LABOR**; **SOCIALISM**, and others. This division of this branch of the subject is exceptionally complete.

Historical Topics

I. POLITICAL PARTIES AND OTHER ORGANIZATIONS.

II. EVENTS CLOSELY RELATED TO POLITICS OR SOCIOLOGY, INCLUDING GREAT EXPOSITIONS.

In the last division of this branch of the subject are included brief articles on the origin and principles of the great political parties, especially of America

and England. There is also an extended article on political parties in the United States, showing their relations to each other, from the formation of the government to the present time. This branch also includes events chiefly of political or sociological interest, such as BLUE LAWS; CORN LAWS; DARTMOUTH COLLEGE CASE; DARIEN SCHEME; FEUDAL SYSTEM; HOME RULE; KU-KLUX KLAN; STATES' RIGHTS; TAMMANY SOCIETY, and similar topics.

Banks and Banking

KINDS.	Results.
<i>National.</i>	(a)
(a) When organized	(b)
(b) Minimum capital	(c)
(c) Supervision	
(d) Number in 1900	NOTED BANKS.
(e) Capital in 1900	<i>Bank of England.</i>
(f) Deposits in 1900	(a) When incorporated
<i>State and Private.</i>	(b) Original capital
(a) Capital	(c) Present capital
(b) Supervision	(d) Present deposit
(c) Number	(e) Present loans
(d) Deposits	<i>Bank of France.</i>
<i>Meaning of.</i>	(a) Established
Check	(b) Security
Draft	(c) Government aid
Exchange	
Deposit	HISTORY.
	Banks B. C.
PURPOSES AND FUNCTIONS.	Roman
(a)	Venice
(b)	Original purpose
(c)	First bank in United States.

TEST QUESTIONS ON BANKS AND BANKING.

- What is a check? A draft? An overdraft? A certified check?
 Does an endorsed check by the payee constitute a receipt?
 What is negotiable paper?
 Are National banks prohibited from loaning money on mortgages?
 How many persons are necessary to organize a National bank? What is the minimum capital?
 Can National banks issue notes for circulation to the full amount of their bonds?
 In what particular does the banking system of the United States differ from that of other leading countries?
 How many National banks in the United States in 1905? How many State banks? Private banks?
 What were the respective total deposits of each at that time?
 When was the first bank chartered in the United States?
 When was the first National bank organized in the United States?
 Where and with what capital?
 What are Savings banks? When and where first organized in the United States of America?
 What are Trust Companies?

QUESTIONS—LAW AND POLITICS.

Why should all citizens be informed in regard to law? To what extent?

Upon what is law based? How and where did the idea originate?

What is meant by common law? Equity? Statutory law? International law?

The following are classed under what kind of corporations: Park boards, school boards, boards of colleges, hospitals, charitable associations, etc.?

Of what are labor unions the result? What are their objects? What have they accomplished? Along what two distinct lines do they work? What are the evils and benefits? How are they regarded by the world in general today as compared with their standing some years ago?

What is known as pooling? In forming a trust, what are the principal aims?

What effect does competition have on business?

Name some beneficial results of trusts to the public. What evils follow?

Name some trusts that affect the public directly. That affect them indirectly. What are some of the large trusts of the United States?

What is the important feature concerning obligations of corporations? What are the two main classes?

In what did courts have their origin?

Name the courts of the United States in their order and the action taken by each during a trial. Name persons participating in a trial.

In a criminal case who is the plaintiff?

What is international law? Why is it necessary?

What are some of the rights and duties of a nation during peace? During war?

What do we mean by politics? What are the two great political parties in the United States? In England? For what does each stand?

What are the minor political parties? What do they represent? Name the statesmen of the United States who have had a powerful influence over the politics of the nation in their time. What great reforms have been accomplished through them?

What do we mean by the term municipal government? By whom is it administered? What authority and control has it?

What is meant by municipal ownership? Is this a world-wide question at present? Along what lines is it being agitated?

What lines of work are performed by those engaged in civil service? Give some of the rules governing the applicants.

What did Hayes do along the line of civil service reform? With what evil does this largely do away?

In what way is immigration an evil? In what way beneficial? To what extent is it being restricted?

What part is socialism taking in the politics of today? Give evils and benefits of this order.

What is your county seat? What are the names of the officers of your county?—commissioners, auditor, register of deeds, treasurer, superintendent of schools. What are their duties?

What are your township officers? What are their duties?

JURY AND TRIAL BY JURY.

What is the meaning of trial by jury? When and where did it originate?

What is the grand jury? Petit jury? What is a panel? What is an indictment?

What does the jury do in case the accusation is unfounded? How many men compose a jury?
 How are jurors chosen? What happens to a juror accused of treason?
 How do they consider the evidence? What happens when the jury fails to agree?
 Why is a coroner's jury called? What is its duty? Its size?
 How many men in a petit jury?

Board of Trade

MEANING.—What is the Board of Trade?

PURPOSES for which it was first organized:

- a.
- b.
- c.

EUROPEAN BOARD OF TRADE:

When and where first organized?
 What city was the first in the world to establish a board of trade?
 How did it differ from the board of trade of today?
 When was the Chamber of Commerce of Paris established?
 Where is the oldest chamber of commerce in Great Britain?
 What chamber of commerce is the grand center of the commerce of the old world?
 With what exchange do American commercial dealers have the most direct connection?
 Name three other leading British exchanges.

AMERICAN BOARD OF TRADE:

When and where first established?
 Name in the order of their rank the American boards of trade.
 When was the Chamber of Commerce of New York established?
 Name the principal boards of trade in the west after Chicago?
 When was the Chicago Board of Trade organized, and with how many members?
 What is meant by trading on "margins?" Explain the process.
 Why do most boards of trade have their own clearing houses?

BASIS OF GRADING:

Why is a strict basis of grading and inspection of wheat observed?
 Give a complete table of grading wheat.
 With regard to what other grains is the same close discrimination made?
 What regulations are made to prevent fraudulent practice on the board of trade?
 What are the rules of the board regarding property bought and sold on the floor?
 When does a board of trade contract mature?
 What is the distinction between *long* and *short* transactions?

CORNER.—What is meant by "corner?" How created? For what purpose?
 Name memorable wheat corners on Chicago Board of Trade.

SIGN LANGUAGE USED BY BROKERS:

Open hand signifies what?
 Back of hand signifies what?
 One finger raised means how many bushels?
 Two fingers raised means how many bushels?
 What is a pit? What is a Bear? A Bull? (which see.)
 How and when are settlements made for transactions on the board?

CORPORATIONS.

What is a corporation?

Have the individual members the same rights and duties as the corporation?

Is a corporation dissolved by the death or withdrawal of members?

What is the distinguishing feature of corporations as compared with other associations and societies?

From what law has the conception of a corporation been taken?

I. PUBLIC CORPORATIONS.

1. States.
2. Cities.
3. Counties.
4. Villages.
5. Parks, etc.

2. Pecuniary Profit.

Railroad companies.
Telegraph companies.
Telephone companies.
Banks.
Insurance, etc.

3. Mutual Aid and Relief.

Building and loan.
Lodges.
Coöperative societies, etc.

4. Incorporated Trusts.

Colleges.
Hospitals.
Charitable institutions.

II. PRIVATE CORPORATIONS.

1. Benefit of Members.

Social.
Artistic.
Scientific.
Religious.

INSURANCE.

How old is insurance? What kind was first used?

Who is the underwriter? What is the premium?

What is marine insurance?

If goods insured are removed from a burning building and are damaged who loses?

Is a loss by lightning the same as by fire? Why did life insurance originate?

What is an endowment policy? What is the tontine policy?

What are examples of a corporation for the benefit of the members?

What is the basis of a corporation for the pecuniary profit of individual members?

How are such corporations regulated? To what are their transactions limited? How are the profits divided?

Give examples of this class of corporations.

What is the first object of corporations for mutual aid and relief?

How are such corporations generally controlled? What are examples of this class?

What are examples of incorporated trusts?

How is a corporation usually formed?

Give four conditions under which a corporation may be dissolved.

In all such cases what becomes of the lands of a corporation?

To what laws are corporations liable?

What privileges does the constitution of the United States prohibit?

What is one of the first principles of corporation law?

What by-laws has a corporation power to make? With what must these by-laws be in harmony?

He teaches best who enables his pupils to dispense with his aid as he governs best who makes his rule unnecessary.

—*Bishop Spalding.*

Literature

Literature is ever young, ever helpful, ever inspiring. So varied are its departments, so wide its scope, so universal its application that no one can escape its benign influence if once he comes heartily in contact with it. Whatever in printed matter brightens, vivifies, uplifts and encourages, that is true literature. Sometimes the spirit emanates from a phrase, a sentence, a paragraph. Again it is a lyric, a drama or a beautiful story that catches the attention, stirs the feelings and molds the character. Whichever it be, it is true literature if it seizes the soul.

Prose and Poetry are the two great divisions of literature, differing widely in their form, but much alike in their essence. To some minds one form makes a stronger appeal than the other, but both will charm the open-minded. While prose may have more intellectual uplift, poetry appeals more strongly to the sense of beauty, beauty in form, in sentiment, in music.

Orations, Essays, Novels, Stories, Fables, such are varied kinds of prose that literature offers; and in poetry there are Epics and Lyrics, with the subordinate classes, Ballads, Odes, Elegies and Sonnets. What a range that is, and how varied its nature! For the gay hours there are lively stories by Kipling, rollicking lyrics by Holmes; for times of doubt the inspiring songs of Longfellow and the courageous essays of Emerson; for times of grief the heartfelt lines of Lowell, the encouraging couplets of Tennyson. No phase of mind is so peculiar that its nature is not known to the great-hearted men who have written for us.

To the young literature is as interesting as a new toy whose working they would know; to the middle-aged, a recreation and an inspiration; to the old, a comfort and a solace. Strangely enough, the same selection may affect thus differently at the same time people of all ages.

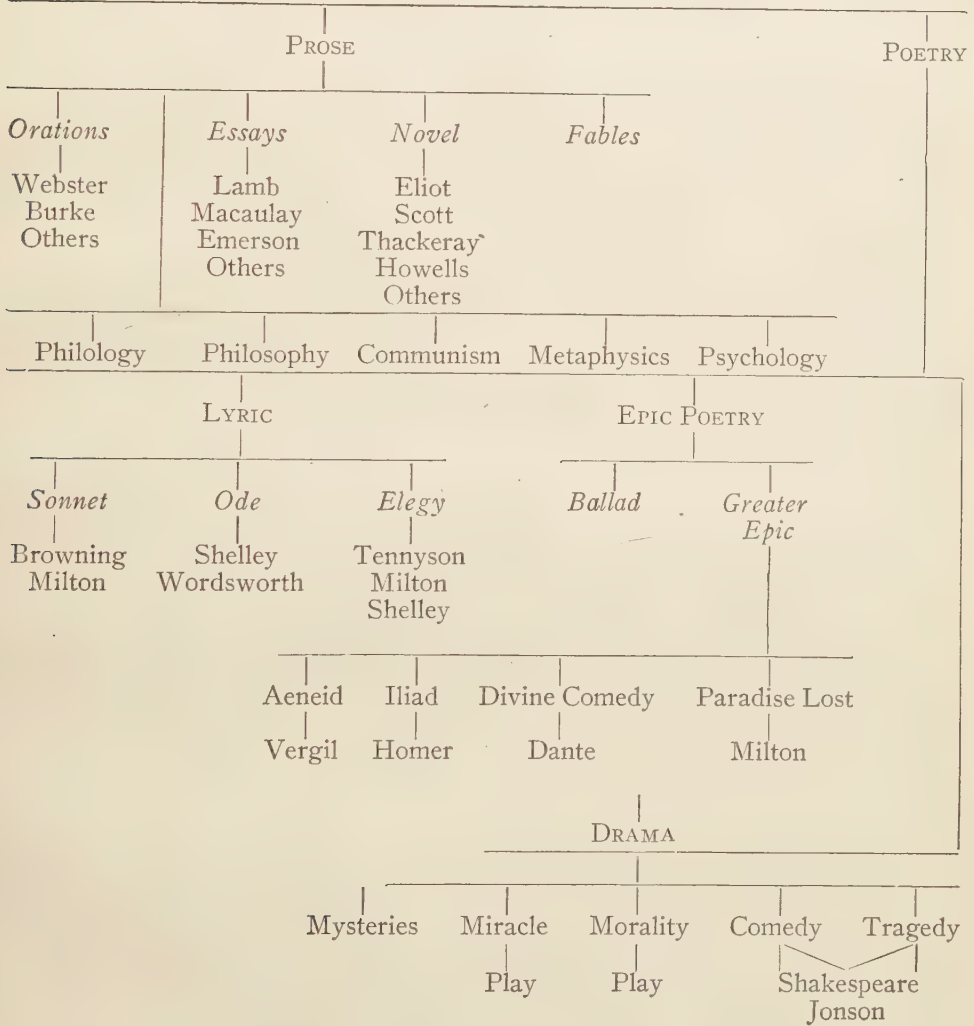
If in the family circle or at school there has been created a desire to read, the desire should be satisfied and the desire converted into a distinct good taste in selection. This may be done if proper books are placed in the hands of the learner. Here is seen the immense value of such an article as that on *READING* in *THE NEW PRACTICAL REFERENCE LIBRARY*. To this the parent or teacher can go to find directions for reading and to get lists of books adapted to children or to adults. There too will be found references to articles in the *REFERENCE LIBRARY* which will carry the reader far into those generous fields of literature which have in them food for every mind.

There will be found hundreds of interesting biographies of well-known writers of every nation throughout the work, giving a list of their writings and in many instances the circumstances under which they were written.

The accompanying outline touches only the literature of England and the United States. It is thought that the cross references in the other sections of the article LITERATURE are self-explanatory.

The outline on *English and American Literature* has been put in graphic form, but has not been carried out to its utmost. For instance, in the discussion of *Poetry*, many more sonneteers, writers of odes and elegists are to be found than are mentioned in the table. The same is true, of course, under *Drama*, but you will note that there are but four great epics of world-wide importance; those are named and the author of each is given.

English and American Literature



American Literature

I. COLONIAL PERIOD.

1. Poets and Their Principal Works.
 - a. Anne Dudley Bradstreet. 1612-1672.
The Tenth Muse.
2. Prose Writers and Their Principal Works.
 - a. Thomas Hooker. 1586-1647.
Fundamental Orders—First Written Constitution.
 - b. Cotton Mather. 1667-1728.
Witchcraft.
Wonders of the Invisible World.
Magnalia.
 - c. Jonathan Edwards. 1703-1758.
Freedom of the Will.
 - d. Benjamin Franklin. 1706-1790.
Poor Richard's Almanac.
Essays.
Autobiography.

II. REVOLUTIONARY PERIOD.

1. Poets and Their Principal Works.
 - a. Philip Freneau. 1752-1832.
The British Prison Ship.
Political Poems.
 - b. John Trumbull.
 - c. Francis Scott Key. 1780-1843.
Star Spangled Banner.
2. Prose Writers and Their Works.
 - a. Alexander Hamilton. 1757-1804.
The Federalist.
 - b. Thomas Jefferson. 1743-1826.
Rights of British America.
Declaration of Independence.
 - c. James Madison. 1751-1836.
The Federalist.
 - d. William Wirt.
 - e. Charles B. Brown. 1771-1810.
Wieland.

III. NATIONAL PERIOD.

1. Poets and Their Principal Works.
 - a. William Cullen Bryant. 1794-1878.
Thanatopsis.
My Country's Call.
The Ages.
Flood of Years.
Translation of the Iliad and Odyssey.
 - b. Henry Wadsworth Longfellow. 1807-1882.
Evangeline.
Hiawatha.
The Spanish Student.
The Courtship of Miles Standish.
Translation of Dante's Divine Comedy.
 - c. John Greenleaf Whittier. 1807-1892.
The Barefoot Boy.
Snowbound.
Maud Muller.
Among the Hills.
 - d. James Russell Lowell. 1819-1891.
The Commemoration Ode.
The Vision of Sir Launfal.
The Cathedral.

- c. Oliver Wendell Holmes.
Old Ironsides.
The Poet at the Breakfast Table.
The Chambered Nautilus.
The Last Leaf.
Wonderful One-Hoss Shay.
- f. James Whitcomb Riley. 1853—
The Old Swimmin' Hole.
Afterwhiles.
Rhymes of Childhood.
- g. Eugene Field. 1850-1895.
Little Boy Blue.
Jes' 'Fore Christmas.
Seein' Things.

2. Prose Writers and Their Principal Works.

II. HISTORIANS.

- a. George Bancroft. 1800-1891.
The United States of North America.
History of the Revolution in North America.
- b. Richard Hildreth. 1807-1891.
The White Slave.
History of the United States.
- c. William H. Prescott. 1796-1859.
Conquest of Mexico.
Conquest of Peru.
- d. John L. Motley. 1814-1877.
The Rise of the Dutch Republic.
The United Netherlands.
The Life of John Barneveldt.
- c. Francis Parkman. 1823-1893.
California and the Oregon Trail.
The Jesuits in North America.
Montcalm and Wolfe.
- f. Theodore Roosevelt. 1858—
The Naval War of 1812.
Life of Thomas H. Benton.
The Winning of the West.
American Political Ideals.

NOVELISTS.

- a. Nathaniel Hawthorne. 1804-1869.
The Scarlet Letter.
The Marble Faun.
The House of the Seven Gables.
- b. James Fennimore Cooper. 1799-1851.
The Spy.
The Pilot.
The Last of the Mohicans.
- c. Harriet Beecher Stowe. 1811-1896.
Uncle Tom's Cabin.
- d. William Dean Howells. 1837—
A Modern Instance.
Venetian Life.
A Foregone Conclusion.
- e. Mary E. Wilkins Freeman. 1862—
Jerome, a Poor Man.
The Portion of Labor.
- f. Henry James. 1834—
Daisy Miller.
A Passionate Pilgrim.

ESSAYISTS.

- a. Ralph Waldo Emerson. 1803-1882.
Representative Men.
The Conduct of Life.
- b. Horace Mann. 1796-1859.
Common School Journal.
Lectures on Education.
- c. William E. Channing.
Sermons and Reviews.

CRITICS.

- a. James Russell Lowell.
My Study Windows.
Among My Books.

HUMORISTS.

- a. Joel Chandler Harris. 1848—
Uncle Remus.
Tales of the Home Folks.
Daddy Jake.
A History of Georgia.
- b. Samuel L. Clemens. 1835—
Innocents Abroad.
Pudd'nhead Wilson.
The Prince and the Pauper.

MISCELLANEOUS WRITERS.

- a. Washington Irving.
Sketch Book.
- b. Bayard Taylor. 1825-1876.
Travel.
Translation of Goethe's Faust.
- c. J. G. Holland.
Nicholas Minturn.
Kathrina.
Garnered Sheaves.
- d. George Ticknor. 1791-1871.
History of Spanish Literature.
Life of Prescott.
- e. Charles Dudley Warner. 1829-1900.
My Summer in a Garden.
As We Were Saying.
The Gilded Age.
- f. Silas Weir Mitchell. 1829—
Youth of Washington.
Hints for the Overworked.
- g. Thomas Bailey Aldrich. 1836-1907.
Cloth of Gold.
The Story of a Bad Boy.
Flower and Show.
Baby Bell.

Drama

I. FORMS.

- 1. Tragedy.
 - a. Subject matter serious or classic.
 - b. Language dignified and graceful.
 - c. Motive of presentation—purification of passions.
- 2. Comedy.
 - a. Less serious than tragedy.
 - b. Treatment somewhat light throughout.
 - c. Originally used as means of ridicule.
- 3. Opera.
 - a. General—Dramatic composition set to music and sung by the artists, enriched by the costumes, scenery, music, etc.
 - b. Grand—Usually serious or classical themes. Generally heavy and impressive treatment, although it is sometimes of a lighter vein.
 - c. Comic—Light, fanciful or humorous. Treatment light and graceful. Oftentimes means of ridicule.
- 4. Pastoral.
 - a. Aimed at a fanciful portrayal of Arcadian and mythological scenes.
 - b. Treatment quiet and in keeping with the subjects.
- 5. Burlesque.
 - a. Depicts dignified and serious subjects of life in a ludicrous manner or vice versa.
 - b. Means of satirical criticism.
 - c. Modern—Mixture of travesty, vaudeville and ballet.
- 6. Farce.
 - a. More extravagant and ludicrous than the comedy. Any absurdity or improbability is allowable.
 - b. Motive—To excite laughter in any event.

7. Mysteries.
 - a. Rude drama presented at solemn festivals; religious in character.
 - b. Object—To strengthen Christian church.
 - c. Extended from twelfth to sixteenth centuries. Passion play Oberammergau is an example.
8. Moralities.
 - a. Allegorical play. Moral discourse praising virtue and condemning vice.
 - b. Object—To influence public sentiment toward right living.

II. DEVELOPMENT.

1. Old Testament.
 - a. Job.
 - b. Songs of Solomon.
2. India.
 - a. Drama much inferior to Greek or modern European.
 - b. Dramatic poetry elegant and tender. Writings voluminous.
3. China.
 - a. Dramatic writings extensive but unknown to other peoples.
4. Greece.
 - a. European drama originated in Greece, foremost nation in literature in early times.
 - b. Drama at first was celebrations of festivals of Bacchus, god of wine.
 - c. Æschylus, first writer of Greek tragedy, wrought many changes in chorus, number of actors, etc.
5. Rome.
 - a. Drama borrowed from Greeks. In a sense imitators.
 - b. Became powerful and influenced modern literature more forcibly than Greece.
6. Italian.
 - a. Foundation of the drama as portrayed by Shakespeare came directly from Italian.
 - b. At first classic models were subjects.
 - c. Great periods were during fourteenth, fifteenth and sixteenth centuries. Noted pastoral dramas occurred.
 - d. Interest waned in seventeenth century.
 - e. Eighteenth century classic tragedy and genuine comedy were restored.
7. French.
 - a. 1684 early school of dramatic writings flourished.
 - b. Voltaire, Moliere, the distinguished dramatists.
 - c. 1820 a new school of art was formed called the romantic in contrast to the former classical subjects. Hugo promoted this school largely.
 - d. Writers in this school, Sardou, Dumas, Rostand.
8. Spanish.
 - a. The drama flourished at the same time as the English and rose to its height at the same time.
9. English.
 - a. Last half of the sixteenth century marked the height of the most brilliant period of the English drama.
 - b. Writers—Spenser, Johnson, Bacon, Shakespeare.
 - c. Theaters were shut up for thirteen years by Puritans.

- d. With Charles II the drama reappeared. Licentious and degrading treatment.
- 10. German.
 - a. At first merely translations from the French.
 - b. Original works appeared later on.
 - c. Schiller and Goethe greatest of modern dramatists.

Shakespeare

BIRTH.

- 1. Born at Stratford-on-Avon, 1564.

PARENTS.

- 1. Of humble origin; respectable tradespeople; financially well-to-do.

EDUCATION.

- 1. Best education grammar school offered.

MARRIAGE.

- 1. Nineteen years of age. In 1592 established in London, engaged in literary work, and also taking some of the leading parts.

CHARACTER.

- 1. Ben Jonson said: "I loved the man and do honor to his memory, on this side idolatry, as much as any. He was indeed honest and of an open nature; had an excellent phantasy, brave notions and gentle expressions."

WRITINGS.

1st Period.

- a. Experimenting in characterization; looseness in construction. Feeling after his powers and testing them.
- b. Writings—Love's Labor Lost, The Comedy of Errors, A Midsummer Night's Dream, Richard III.

2d Period.

- a. With increased assurance follows his brilliant portrayal of English history, comedy of life in general and one great romantic tragedy, King Richard II.
- b. Writings—Parts I and II of Henry IV, King John, Romeo and Juliet, The Merchant of Venice, Much Ado About Nothing, As You Like It, etc., etc.

3d Period.

- a. Master of all the resources of his art.
- b. Personal experiences portrayed in writings. Comedy becomes bitter; tragedies black with human experiences.
- c. Writings—Measure for Measure, Julius Cæsar, Hamlet, King Lear, etc., etc.

4th Period.

- a. Attains glad serenity of mind, enabling him to write his last romantic plays.
- b. Writings—Chiefly poetry.

DEATH.

- 1. Dies in 1616. Buried in Stratford church; a monument with bust and epitaph was soon afterward set up.

QUESTIONS.—LITERATURE.

How was James Fenimore Cooper connected with the navy and consular service of the United States?

Who was the friend of Emerson whose genius in certain respects much resembled that of the philosopher?

What is the nature of Bret Harte's humor?

How was William Dean Howells connected with the foreign administration of the United States?

In what practical way did Washington Irving get the material for his "Tour on the Prairies?"

In which of Elizabeth Stuart Phelps' works appears the problem of woman in professional life?

James Whitcomb Riley began life in what humble way? What is his most famous poem?

What famous novel on social work did Edward Bellamy write?

In what periodical did Mrs. Stowe first publish "Uncle Tom's Cabin?"

What was the hermit period of Thoreau's life?

When was the first edition of Webster's dictionary published?

In what philanthropic work did Walt Whitman ruin his health?

What distinct style of literature did Addison found?

Who described Francis Bacon as the "wisest, brightest, meanest of mankind?"

Which is the longest and most polished of Mrs. Browning's works?

To what romantic circumstances was the publication of Burns' first book of poems due?

For what calling was Carlyle trained? What educational endowment did he make?

Which of Dickens' works embodied his experiences in America?

Which are Henry Drummond's three best-known works?

What was the novel that established George Eliot's high rank?

In the verse of what language is Thomas Gray almost unsurpassed?

What is the elegy in which Shelley has honored his friend Keats?

In what novel do Kingsley's opinions on social and economic questions appear?

At what exceptionally early age was Pope recognized as an able poet?

Which of Charles Reade's novels was directed against the English prison system?

What desire of Walter Scott eclipsed even his literary ambition?

What class of people did Swift try to better and to what end did he bequeath his fortune?

When did Tennyson become poet laureate and what was the first great poem written after the event?

What career did Thackeray first plan for himself and why did he give it up?

To what subject is the literary talent of Israel Zangwill devoted?

What work of Hans Christian Andersen was written by him in English?

What was the period of Goethe's and Schiller's intimate association?

What constitutes the strength and what the defective element in Jean Paul Richter's works?

What was the tragic death of Æsop?

How does Aristophanes rank in Grecian literature?

How did Herodotus prepare himself for his great work? What well-known appellation has been given him?

In which of his writings is Horace at his best?

What was Livy's great purpose in his works?

What peculiar circumstance directed Virgil toward a literary career?

Whose translation of the Æneid has become most popular?

For what reason has the history of Dante's life become half mythical?

Has Dumas a rightful claim to the 1,200 volumes which bear his name?

What is the characteristic of Jules Verne's writings which makes them appeal to readers of all ages?

For what is Emile Zola noted?

What positions did Bjornson and Ibsen hold together during their lives?

What is literature? How old is it?

What is the first account we have of a book? On what was it written?

How old is Sanskrit Literature? Chinese?

What is Poetry? Prose? What is a Lyric? An Epic? A Sonnet? An Ode?

Name the divisions into which prose is sub-divided.

What is the difference between an essay and an oration?

When did Chaucer live? What is he popularly called as relates to English Poetry?

When, where, and by whom was printing invented? When was the first book printed?

Where and when was Shakespeare born? When did he die? Where is he buried?

How does Shakespeare rank as a dramatist?

Name five of his most noted productions.

Name five contemporary writers of Shakespeare.

Who wrote "Paradise Lost"?

For what was Spencer noted?

When did Burns live? Name some of his noted poems.

Is Walter Scott more famous for his poems than for his novels? What caused Scott to give up poetry for prose? What are his most famous novels? Name three.

When did Tennyson live? What was the character of his poems?

What famous American orator lived during the Revolutionary War?

For what was Franklin chiefly noted in the field of literature?

Who wrote "The Star Spangled Banner"? "Home, Sweet Home"? "America"?

Who is the best known American poet? Novelist? Essayist? Historian?

For what is James Whitcomb Riley best known?

Name three prose writers and three poets of the United States living today.

Why is the study of literature so important? Give three reasons for your answer.

Why was Whittier called the Quaker poet?

For what production is Oliver Wendell Holmes best remembered? Lowell? Hawthorne? Cooper?

Yet Love will dream and Faith will trust
(Since He who knows our need is just)
That somehow, somewhere, meet we must.
Alas for him who never sees
The stars shine through his cypress trees!
Who, hopeless, lays his dead away,
Nor looks to see the breaking day
Across the mournful marbles play!
Who hath not learned, in hours of faith,
The truth to flesh and sense unknown,
That Life is ever lord of Death,
And Love can never lose its own!

—“Snowbound,” Whittier.

Gems of Literature

We give here fifty-two selections from as many eminent authors and literary personages. As the pupils become familiar with the world's best thoughts they will unconsciously adopt them as their own and ever be actuated by them. These splendid lessons on character, education, industry, sincerity, truth, wisdom and kindred subjects, supplemented with the lives of their authors, as given in THE NEW PRACTICAL REFERENCE LIBRARY, should prove of inestimable value.

By simply committing one gem each week and making a study of the author, at the end of one year the student will be the master of the choicest sayings of the ages, and besides the value as a character builder it will be a source of information that will prove a daily blessing.

The only way to succeed in such an effort is by systematic study, and if ten minutes each day for only one year be given to this work the fund of information acquired will prove a happy surprise and this single acquirement amply repay the small investment made in THE NEW PRACTICAL REFERENCE LIBRARY.

Talk not to me of the stock whence you grew,
But show me your stock by what you can do.

—*Spurgeon.*

Lost, yesterday, somewhere between sunrise and sunset, two golden hours, each set with sixty diamond minutes. No reward is offered, for they are gone forever. —*Horace Mann.*

Breathes there a man with soul so dead,
Who never to himself hath said,
"This is my own, my native land?"
Whose heart hath ne'er within him burned,
As home his footsteps he hath turned
From wandering on a foreign strand?

—*Sir Walter Scott.*

Do not look for the flaws as you go through life,
And even when you find them,
It's wise and kind to be somewhat blind,
And look for the virtue behind them.

—*Wilcox.*

Laziness grows on people; it begins in cobwebs and ends in iron chains. The more business a man has to do, the more he is able to accomplish, for he learns to economize his time. —*Sir Matthew Hale.*

Do the duty which lies nearest thee, which thou knowest to be a duty. Thy second duty will already have become clearer. —*Carlyle.*

I would not enter on my list of friends
(Though graced with polished manners and fine sense,
Yet wanting sensibility) the man
Who needlessly sets foot upon a worm.

—*Cowper.*

If a task is once begun,
Never leave it till it's done;
Be the labor great or small,
Do it well, or not at all.

—*Phæbe Cary.*

Happy hearts and happy faces,
Happy play in grassy places—
That was how, in ancient ages,
Children grew to kings and sages.

—*Robert Louis Stevenson.*

Diving and finding no pearls in the sea,
Blame not the ocean: the fault is in thee.

—*Alice Cary.*

Awake, he loved their voices,
And wove them into his rhyme;
And the music of their laughter
Was with him all the time.

Though he knew the tongues of nations,
And their meanings all were dear,
The prattle and lisp of a little child
Was the sweetest for him to hear.

—“About Longfellow,” by *Riley*.

We sow a thought and reap an act; we sow an act and reap a habit; we sow a habit
and reap a character; we sow a character and reap destiny. —*Thackeray*.
People seldom improve when they have no other model but themselves to copy after.
—*Goldsmith*.

The only reason we don't see good things everywhere is because we haven't good eyes.
—“A Fool of Nature,” *Julian Hawthorne*.

Ah, faithful to Little Boy Blue they stand,
Each in the same old place,
Awaiting the touch of a little hand,
The smile of a little face.
And they wonder, as waiting these long years through,
In the dust of that little chair,
What has become of our Little Boy Blue
Since he kissed them and put them there.
—“Little Boy Blue,” *Eugene Field*.

Then here's to our boyhood, its gold and its gray!
The stars of its winter, the dews of its May!
And when we have done with our life lasting toys,
Dear Father, take care of Thy children—The Boys.
—“The Boys,” *Oliver Wendell Holmes*.

Do you count your birthdays by the year,
And thank the gods with gladness and good cheer,
O'erlook the failings of your friends, and grow
Gentler and better as your sands run low?
—A Prayer for Health and Content.
Translation from “Horace” by *Conington*.

With malice toward none, with charity for all; with firmness in the right, as God gives
us to see the right, let us finish the work we are in—to bind up the nation's wound; to call
for him who shall have borne the battle and for his widow and his orphans; to do all which
may achieve and cherish a just and lasting peace among ourselves and with all nations.
—Speech at Gettysburg, *Abraham Lincoln*.

He who, from zone to zone,
Guides through the boundless sky thy certain flight,
In the long way that I must tread alone,
Will lead my steps aright.
—“Ode to a Waterfowl,” *Wm. Cullen Bryant*.

Errors, like straws, upon the surface flow;
He who would search for pearls must dive below.
—*John Dryden*.

In battle or business, whatever the game,
In war or in love, it's ever the same;
In the struggle for power, or scramble for pelf,
Let this be your motto, “Rely on yourself.” —*Saxe*.

Our greatest glory consists not in never falling, but in rising every time we fall.
—*Emerson*.

My son, observe the postage stamp! Its usefulness depends upon its ability to stick to
one thing until it gets there. —*Josh Billings*.

But chief of all,
 Oh loss of sight, of thee I most complain!
 Blind among enemies, O worse than chains,
 Dungeon, or beggary, or decrepit age!
 Light, the prime work of God, to me's extinct,
 And all her various objects of delight
 Annulled, which might in part my grief have eased;
 Inferior to the vilest now become
 Of man or worm the vilest here excel me.
 They creep, yet see; I, dark in light, exposed
 To daily fraud, contempt, abuse and wrong,
 Within doors or without, still as a fool
 In power of others, never in my own
 Scarce half I seem to live, dead more than half.

—Milton.

Beware of how you say more than you mean; better mean more than you say.
 —Gladstone.

The moment I heard of America, I loved her; the moment I knew she was fighting for freedom, I burnt with a desire of bleeding for her; and the moment I shall be able to serve her at any time or in any part of the world, will be the happiest one of my life.

—Lafayette.

I steal by lawns and grassy plots,
 I slide by hazel covers;
 I move the sweet forget-me-nots
 That grow for happy lovers.

I chatter, chatter as I flow
 To join the brimming river;
 For man may come and man may go,
 But I go on forever.

—“The Brook,” Tennyson.

It is nearly an axiom, that people will not be better than the books they read.

—Bishop Potter.

We grow like what we think of; so let us think of the good, the true, and the beautiful.

—Phillips Brooks.

Ponder well, and know the right,
 Onward, then, with all thy might!
 Haste not! years can ne'er atone
 For one reckless action done.

—Goethe.

I hope I shall always possess firmness and virtue enough to maintain what I consider the most enviable of all titles, the character of an “Honest Man.”

—George Washington.

My idea is this: ever onward. If God had intended that man should go backward, He would have given him an eye in the back of his head.

—Victor Hugo.

Boys flying kites haul in their white winged birds;
 You can't do that way when you're flying words.
 “Careful with fire,” is good advice, we know;
 “Careful with words,” is ten times doubly so.
 Thoughts unexpressed may sometimes fall back dead;
 But God himself can't kill them when they're said.

—Will Carleton.

The next gale that sweeps from the north will bring to our ear the clash of resounding arms. Our brethren are already in the field! Why are we here idle? What is it that gentlemen wish? What would they have? Is life so dear or peace so sweet as to be purchased at the price of chains and slavery? Forbid it, Almighty God! I know not what course others may take; but as for me, give me liberty or give me death.

—Patrick Henry.

So, Willy, let you and me be wipers
 Of scores out with all men—especially Pipers;
 And whether they pipe us free from rats or from mice,
 If we've promised them aught, let us keep our promise.

—“The Pied Piper of Hamelin,” Robert Browning.

Which is the wind that brings the heat?
The South wind, Katy; and corn will grow
And peaches redden for you to eat,
When the South begins to blow.
—“What the Wind Brings,” *Edmund Clarence Stedman*.

He prayeth best who loveth best
All things both great and small;
For the dear God who loveth us,
He made and loveth all. —*Samuel Taylor Coleridge*.

Full many a gem of purest ray serene
The dark unfathomed caves of ocean bear;
Full many a flower is born to blush unseen,
And waste its sweetness on the desert air.
—“Elegy in a Country Churchyard,” *Thomas Gray*.

Nothing useless is and low,
Each thing in its place is best;
And what seems but idle show
Strengthens and supports the rest. —*Longfellow*.

Sloth, like rust, consumes faster than labor wears; while the used key is always bright.
—*Benjamin Franklin*.

A mere life of ease is not in the end a satisfactory life, and, above all, it is a life which ultimately unfits those who follow it for serious work in the world. —*Roosevelt*.

Honor and shame, from no condition rise;
Act well your part, there all the honor lies. —*Pope*.

Not what we give, but what we share,
For the gift without the giver is bare;
Who gives himself with his alms feeds three—
Himself, his hungering neighbor and me. —*Lowell*.

Be good, dear child, and let who will be clever,
Do noble things, not dream them all day long;
And so make life, death, and that vast forever
One grand sweet song. —*Chas. Kingsley*.

Strike—for your altars and your fires;
Strike—till the last armed foe expires;
Strike—for the green graves of your sires,
God—and your native land! —*Fitz Greene Halleck*.

There is a tide in the affairs of men,
Which, taken at the flood, leads on to fortune;
Omitted, all the voyage of their life
Is bound in shallows, and in miseries. —*Shakespeare*.

He smote the rock of the national resources, and abundant streams of revenue gushed forth. He touched the dead corpse of Public Credit, and it sprang upon its feet.
—Speech on Hamilton, March 10, 1831.—*Webster*.

But words are things, and a small drop of ink,
Falling, like dew, upon a thought, produces
That which makes thousands, perhaps millions, think. —*Byron*.

Unanchor'd ships, they blow and blow,
Sail to and fro, and then go down,
In unknown seas that none shall know,
Without one ripple of renown.
Poor, drifting dreamers sailing by,
They seem to only live to die. —*Joaquin Miller*.

I care not that sharp thorns grow thick below
And wound my hands and scar my anxious feet:
I only care to know God's roses grow,
And I may somewhere find their odor sweet.
—“Care and Carelessness,” *Frank W. Gunsaulus*.

Every difficulty that is overcome by a pupil's own efforts tends to develop in him an ambition to conquer other difficulties. Few, if any, joys can be compared with the ecstatic joy of victory. —“Thinking and Learning to Think,” *Schaeffer*.

He teaches best who enables his pupils to dispense with his aid as he governs best who makes his rule unnecessary. —*Bishop Spalding*.

Reading

As READING constitutes the basis of the greater part of our knowledge, an important factor in the formation of character, the source of much of our enjoyment and happiness, the means of promoting individual and national growth, it has been our aim in the light of its importance to give it a thorough and interesting treatment in THE NEW PRACTICAL REFERENCE LIBRARY.

Every intelligent parent knows the importance and difficulty in these days of many books and sensational newspapers to make a wise selection for their children's reading. It is almost an axiom that the boy who is provided with good books will not select the worst for himself.

It is our belief that parents will welcome the splendid list of books found under the sub-topics in the article on “Reading.” These lists have been most carefully selected, prepared and classified to fit the various grades and ages. Such books are bound to exert an influence of lasting good and, what is of far greater value, form a love for good reading. The topical list for adults is also very complete, taking up in turn works of standard authors of fiction, poetry, essays, dramas, etc., together with English and American authors in general. The reader is also referred to the general subject of LITERATURE, the treatment of which is closely allied to that of READING. It will thus be clear that by looking up correlated subjects and acquainting oneself with the various authors mentioned one is led into a very broad and practical field of valuable and entertaining study.

OUTLINE.

I. GENERAL PURPOSES.

1. Thought-getting.
2. Thought-giving.
3. A love for good literature.
4. Training powers of mind.
 - a. Memory.
 - b. Will-choice or selection.
 - c. Imagination.
 - d. Thought.
 - e. Culture in general, polish and fluency in talking, etc.
5. Means of acquiring practical knowledge.
6. Means of mental, moral, spiritual and physical growth.
7. Means of influencing others.

II. EARLY YOUTH.

1. Primary.

- a. Acquiring thought—learning to read.

Methods.

Study.

Recitation.

- b. Material.

Course of study in public schools or other institutions.
Supplementary reading suited to age. (See List.)

- c. Objects.
 - Correct pronunciation.
 - Natural tones.
 - Correct expression.
 - Knowledge of words.
 - Excite interest for further work.

III. YOUTH.

- i. Intermediate and Grammar Grades.
 - a. Purposes.
 - Fluency in oral expression.
 - Silent reading.
 - Love of good literature.
 - Cultivation of choice.
 - b. Methods of teaching.
 - Sustain interest.
 - Intellectual element.
 - Discussions and explanations.
 - Historical and geographical setting.
 - Understanding of all allusions.
 - Comprehension of subject matter.
 - Appealing to imagination.
 - Reference work taken up to great extent.
 - Supplemental reading on all subjects. (See List.)

IV. ADULT.

- i. Attitude of mind.
 - a. Interest.
 - b. Enjoyment.
- 2. Cultivation of taste continued.
 - a. Means.
 - Best authors.
 - Beauty of expression.
 - Exercise of power in any direction.
 - Description.
 - Instruction.
 - Indulgence, individual tastes.
 - Dangers of.
 - Advantages of.
 - Enjoyments of.
 - Importance of.
- 3. Results of correct reading.

a. Usefulness in world. - Home. - Business. - Social.	b. To oneself. - Development. - Moral. - Intellectual. - Spiritual. - Physical.
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V BOOKS FOR YOUNG FOLKS.

- i. See lists given.
 - a. Primary.
 - Hiawatha Primer.—Holbrook.
 - Classic Stories for Little Ones.—McMurry.
 - When Life Is Young.—Dodge, etc., etc.
 - Others.

b. Intermediate grades.

Tanglewood Tales.—Hawthorne.

Hiawatha.—Longfellow, etc., etc.

Others.

c. Grammar grades.

Works by the following authors: Irving, Whittier, Holmes, Cooper, Field, Lowell, Shakespeare, Twain, Church.

d. High school.

Competent to select their own reading from standard literature of all countries and authors. (See list in NEW PRACTICAL REFERENCE LIBRARY under reading literature.)

VI. BOOKS FOR ADULTS.

1. For suggestive lists see sub-topics under Reading of

a. Fiction.

b. Narrative poems.

c. Essays.

d. Dramas.

2. American and English literature under Reading.

3. Literature as treated in THE NEW PRACTICAL REFERENCE LIBRARY.

QUESTIONS.

What great influence have state and national libraries had upon the world?

Turn to the subject of Libraries in THE NEW PRACTICAL REFERENCE LIBRARY and notice what the world is doing along this line.

Have you a library in your town? Your county? What factor are you in its growth?

What is being done along practical lines with the reading circles, etc.?

What is the history of the Library of Congress? Name some noted libraries of the United States.

Why are elaborate courses of reading often failures?

What factor is interest in the subject of reading? How may this be cultivated? Is individual taste a strong trait in interest?

What are the dangers of indulgence in individual taste?

Why and how should individual taste be cultivated? What does this lead to in literary writings?

What are the literary merits of a work? Where do we find these in perfection? Do they appeal to all alike? Why not?

How can we cultivate an appreciation of literary style?

When and how is time wasted in reading?

Is it necessary that all reading be on the instructive order?

What style of reading appeals directly to the emotions? Why is it essential that this class of literature be of the best?

What does the novel portray? What is its scope? What importance is it in education? Name standard ones with their authors.

What powers of the mind are exercised in the reading of an essay? How does it affect the life outwardly? What are some noted essays and by whom written?

What influence has the reading of poetry upon the life?

Every person has two educations—one which he receives from others, and one, more important, which he gives himself. —*Gibbon*.

Machines and Engineering

Under the general subject of ENGINEERING we have called attention to the different departments and outlined the work of each. Under CIVIL ENGINEERING we include all kinds of construction other than military and naval. These topics are treated under their separate heads, as CANALS, RAILROADS, HARBORS, WATERWORKS, IRRIGATION, etc.

As TRANSPORTATION is really a subhead of ENGINEERING, a study of our Outline on TRANSPORTATION will be beneficial, as will also the article itself in THE NEW PRACTICAL REFERENCE LIBRARY, together with its subheads. This is one of the most important questions of the day, of interest both to the individual and nation alike, and a close examination of the different lines of work as described in the LIBRARY ought to give a very comprehensive view of the situation in the engineering world today.

In connection with our outline of ENGINEERING we append the names of important machines which constitute such an important factor in the problems confronting ENGINEERING today. These are treated fully under their own heads.

ENGINEERING.

- I. DEFINITION.
- II. HISTORY OF.
- III. GENERAL PURPOSE.
 - I. Construction of
 - a. Large buildings.
 - b. Bridges.
 - c. Canals (see Outline).
 - d. Harbors.
 - e. Railroads (see Outline).
 - f. Street railways.
 - g. Telegraph (see Outline).
 - h. Telephone.
 - i. Waterworks.
 - Aqueduct.
 - Irrigation (see Outline).
- IV. DIVISIONS.
 - 1. Civil Engineering (see "Construction of," above).
 - a. Electrical.
 - b. Mechanical.
 - c. Sanitary.
 - 2. Military Engineering.

- a. Construction of roads, fortifications and other defenses for country.
3. Marine Engineering.
 - a. Construction of ships and other naval affairs.

V. MACHINES.

Flying Machine.	Locomotive.	Solar Engine.
Compass.	Magic Lantern.	Steam Engine.
Corn Harvester.	Microscope.	Steam Hammer.
Cotton Gin.	Phonograph.	Steam Shovel.
Gas Engine.	Printing Press.	Steam Turbine.
Hydraulic Engine.	Reaping Machine.	Threshing Machine.
Hydraulic Ram.	Sewing Machine.	Turbine Wheel.
Knitting Machine.	Separator—Cream.	Type.
Linotype.	Snow Plow.	Typewriter.
Monotype.		Voting Machine.

QUESTIONS.

In the construction of railways what are some of the obstacles to overcome by means of engineering?

In what enterprises would an electrical engineer be employed?

Name some of the machinery in use on a farm and in each case tell of the labor saved.

What ruins in Egypt attest to skill in engineering? In Rome? In Babylon?

What machines have you seen in your town? In what respect are they labor-saving?

What record has Santos Dumont made in aerial navigation? What part did his airship take in the St. Louis exposition?

Is the airship at present of any practical importance? What is said of its future?

What is a compass? Where is it necessary to use one? Why?

Compare the amount of work accomplished by the cotton gin in one day with that of one person for a day.

How did this invention affect the world?

In the gas engine what materials are used to generate the gas?

In what cases is an hydraulic engine preferred?

When is it practicable to use an hydraulic ram?

The knitting machine is used in what factories?

What is the linotype? It does the work of how many men working by hand?

Why and in what work is the monotype preferred to the linotype?

To what particular use is the magic lantern put?

For what is a microscope used? Its use would be an aid in what studies?

What is a phonograph? How does it differ from a graphophone? Is it ever used in business?

What are some of the late developments in the printing press?

What grains are harvested by the reaping machine? What is the chief harvester company in the United States? What is the annual business in this machine?

Name the kinds of sewing machines you have seen. What work can the sewing machine accomplish?

With what work does the cream separator do away? In what enterprise is it particularly necessary?

If a man empties his purse into his head, no man can take it away from him. An investment in knowledge always pays the best interest.

—Franklin.

Mathematics

In the general article *Mathematics*, besides the definitions of the several branches or divisions of the subject, there are references to separate articles upon each of these subjects. In each of these articles, *Arithmetic*, *Algebra*, *Geometry*, *Trigonometry*, *Analytical Geometry* and *Calculus*, the definition and description of the field covered is given, as well as a statement of the symbols used, the fundamental operation and, in the case of *Arithmetic*, the common course of study in schools.

The article *Mathematics* also refers to the article upon each of the important subjects of which mathematics treats, namely, *Number*, *Angle*, *Line*, *Plane* and *Solid*. Each of these articles contains definitions of the important classes which it includes or cross-references to separate articles upon these classes. For instance, the article *Number* includes a statement concerning complex numbers and prime and composite numbers and cross-references to *Infinity* and *Infinitesimal*, *Negative Quantity*, *Imaginary Quantity*; also to *Figurate Number* and to *Number*, *Methods of Teaching*. The article *Solid* contains cross-references to *Cone*, *Cube*, *Cylinder*, *Globe*, *Prism*, *Pyramid*, *Sphere*, *Tetrahedron*. Under *Line* there is a cross-reference to *Curves*. Under *Plane* there are cross-references to *Square*, *Circle*, *Triangle*, *Polygon* and *Ellipse*.

Among the special processes and principles described in separate articles are *Cancellation*, *Factor*, *Fractions*, *Mensuration*, *Power*, *Root*, *Progressions*, *Proportion*, *Function*, *Coördinates*, etc. A special article is given to *NUMBER*, *METHODS OF TEACHING*, and this is referred to from the article *METHODS OF TEACHING* and from the articles *ARITHMETIC* and *NUMBER*.

The department of weights and measures is centered in two general articles, one entitled *Weights and Measures*, the other called *Unit*. In the former the common system, or English system, of weights and measures is fully described, with the values of the various units, and a cross-reference is made to the article *Metric System*, which contains a complete account of the metric system, together with tables showing its relation to the English system. Reference is also made in this article to special articles on the various common units of measurement, and in each of these articles the system of which the unit forms the base is also described. In the article *UNIT* the units commonly used in the physical sciences are described, and reference is also made to the article *WEIGHTS AND MEASURES*, and to the articles on the various common units of measurement. This division of weights and measures includes also that of coin and money. In the article *Money*, besides a discussion of the theory of money from the standpoint of economics, a table is given showing the standard units of coinage in each of the important countries, and the value of these coins relative to the gold dollar of the United States. Reference is also made in this article to the article *Currency*, *Banks and Banking*, *Clearing House*,

Mint, and to the articles on each of the important standard coins. In each of these articles the value of the unit described relative to that of the gold dollar of the United States is given, and also the equivalent of the unit in the coins of other leading nations.

OUTLINE.

- I. GENERAL ARTICLE.
 1. Classification and definitions of important branches.
 2. History.
- II. BRANCHES.

1. Arithmetic.	4. Trigonometry.
2. Algebra.	5. Analytical Geometry.
3. Geometry.	6. Calculus.
- III. SUBJECTS.
 1. Number.
 - a. Definition.
 - b. Classification.
 2. Angle.
 3. Solid.
 4. Line.
 5. Plane.
- IV. PROCESSES AND PRINCIPLES.
- V. METHODS.
 1. Number, Methods of Teaching.
- VI. WEIGHTS AND MEASURES.

QUESTIONS.

The science of mathematics was developed by what nation?

In what respect does mathematics differ from all other sciences?

In what manner has it aided investigation in other sciences—notably which?

What do we mean by an exact science?

What is the simplest branch of mathematics and the one in most common use?

Mention occupations where a knowledge of mathematics is required. Where only a knowledge of arithmetic is required.

In what professions based upon arithmetic are the methods undergoing constant improvement?

What does our twentieth century business college boast of along the line of up-to-date methods?

A mastery of arithmetic should secure what results?

Can it be said that a knowledge of number is inborn? What proof have we?

What is the value of arithmetic from a business standpoint?

What traits does it establish from a mental standpoint?

What is the practical use of algebra?

In what is it superior to arithmetic?

With what does it deal? Where is it used?

Of what does geometry treat? In what lines of business is it used?

Upon what does geometry reasoning depend?

Of the following, what knowledge of mathematics is necessary: Astronomy? Physics? Engineering? Carpentering? Architecture? Surveying? Banker? Bookkeeper? Ordinary citizen?

Money

- I. USES.
 - 1. Medium of Exchange.
 - 2. Measure of Value.
 - 3. Standard of Value.
- II. PROPERTIES.
 - 1. Portability.
 - 2. Durability.
 - 3. Homogeneity.
 - 4. Divisibility.
 - 5. Stability.
- III. STANDARD.
 - 1. In olden times.
 - 2. With semi-civilized.
 - 3. Gold.
 - 4. Silver.
- IV. CURRENCY.
 - 1. Gold certificate.
 - 2. Silver certificate.
 - 3. Treasury notes.
 - 4. United States notes.
 - 5. National bank notes.
- V. COMMERCIAL PAPER.
 - 1. Checks.
 - 2. Drafts.
 - 3. Notes.
- VI. STUDY OF EXCHANGE.
 - 1. Domestic.
 - 2. Foreign.

QUESTIONS.

Should you find yourself in France with a \$20 goldpiece, how many francs would you get in changing it?

How many marks would the Berlin banker give you for it?

How many yen would you receive for it from the banker of Tokyo? How many liang from the banker of Peking?

When were skins, shells, etc., used as common mediums of exchange? What did this entail?

Why was not iron, lead, tin or copper adopted in place of gold and silver?

What is standard money? Token money? Bank money?

How many dollars of our money are necessary to equal the pound sterling of England?

What is the value of the Mexican dollar in the United States?

What is the standard unit and its value in the following countries: Brazil? Italy? Panama? Denmark? Spain?

CORRELATED SUBJECTS: Currency, Banks and Banking, Clearing House, Mint, Credit, Tender.

Mint

- I. DEFINITION.
- II. ANCIENT.
 - 1. Local officer controlled issuing of money.
- III. MODERN.
 - 1. Sovereigns of foreign countries hold exclusive right to issue money.
 - 2. United States government has exclusive right.
 - a. Location of.
 - b. Number.
 - c. Director appointed by whom?
- IV. PROCESSES OF COINING.
- V. ASSAY OFFICES ALSO AT MINT.

QUESTIONS.

When and where was the first mint established?

When and where was the first mint established in the United States? What was the first coin issued and in what year?

How many mints are there now in the country and where located? Can you see any reason for the location of one at Carson City?

CORRELATED SUBJECTS: Money—Coining.

A true American sentiment recognizes the
dignity of labor and the fact that honor lies
in honest toil. —Cleveland.

Military and Naval

In the general articles ARMY and NAVY will be found a history of the armies and navies of all the leading nations of the world. All important wars, such as the RUSSO-JAPANESE, the SPANISH-AMERICAN, etc., are described under their respective headings. All noted battles and naval engagements, such as the BATTLE OF ANTIETAM, the BATTLE OF MANILA BAY, are described in articles to themselves, accompanied by helpful outline maps. Besides all correlated subjects are generously treated, such as NAVAL ACADEMY, MILITARY ACADEMY, NAVY, DEPARTMENT OF, ARMS AND ARMOR, ARMOR PLATE, CANNON, MUSKET, RIFLE, MILITARY SCIENCE, WARSHIPS, MILITIA, TORPEDO, SUBMARINE BOAT, TACTICS, etc. Biographies of all the leading military and naval commanders will be found throughout the work.

ARMY.

ANCIENT ARMIES.

When and where did the first military organization flourish? Who was its founder?

Who was Xerxes? Describe his invasion of Greece, and the naval battle at Salamis. How does this naval battle rank?

What army vanquished the Greek forces and excelled in spirit and discipline?

MEDIEVAL ARMIES.

What caused the disruption of the national armies of this period?

What is said of the battles of this period? What combats were common to this time?

MODERN ARMIES.

What recent wars have brought great improvements? Name three and give several improvements resulting from each.

What was the length of the battle line in the battle of Mukden? How was this made possible?

What is an intrenchment? A skirmish?

In what way are automobiles useful? Balloons? Searchlights? Range-finders? Explosives?

To what degree of perfection was sanitary science carried in the Russo-Japanese War? What was the loss in killed and wounded on each side?

UNITED STATES ARMY.

How does the size of the army of the United States compare with other leading countries?

What requirements would you have to possess and fulfill to become eligible for an appointment to West Point?

From what time does our military history date?

How many men were engaged by the Colonies in the Revolutionary War?

What was the enrollment of the regular army in 1790? In 1861?

For how many volunteers did Lincoln call in April, 1861, and for what time? What was the total number enrolled during the war?

How many men were raised by the southern states?

By the army reorganization bill of 1901, what is now the size of the standing army?

Into how many departments is our army divided? Within the limits of what department do you reside? Who is the commander?

Granting that every fifth person in the United States is liable to military service, what would be the number of men of such an army?

Is military service obligatory in Russia? In Germany? Japan? Why not in the United States?

What is the size of the British army? The French? The German? The Japanese? The Russian?

GREAT BATTLES.

Name ten and tell what side was victorious, and give the number of killed, wounded or captured.

GREAT GENERALS.

Make a list of ten, naming the principal battles in which engaged and characteristics of each.

NAVY.

GENERAL.

What is a knot? How does it compare in length with a mile?

When were commercial ships safe in olden times?

What do you understand by merchant marine?

Why have wooden war vessels been abandoned?

What are the comparative sizes of the navies of the following countries: Great Britain, Germany, Japan, United States, France, Italy, Russia?

What South American country holds first rank?

UNITED STATES.

Who is commander in chief of our navy?

When was the Naval Academy established? Where is it located? What are the requirements for admission? What is done from June to September? How many cadets are allowed for each senator? For each representative?

How many men are now engaged in the American navy?

What is the cost of the navy yearly?

How many first-class battleships were in the navy in 1906? How many torpedo boats?

Going at thirty knots per hour, how long would it require a torpedo boat to cross the Atlantic, from New York to Liverpool? Would it outrun a freight train running at usual speed?

What was the cost of the Dreadnaught, one of the largest warships afloat? (See WARSHIPS.)

Describe the battle of Manila. Who commanded the American fleet? How many ships were sunk?

Who invented the Monitor?

What is a torpedo boat? A submarine boat?

GREAT NAVAL BATTLES.

Make a list of ten of the most noted naval battles in the world's history, in what waters they occurred, and the results.

NAVAL HEROES.

Name five great American and five great foreign naval commanders and tell something of interest of each.

You cannot dream yourself into a character;
you must hammer and forge yourself one.
—*Froude.*

Mythology

“MYTHOLOGY, the collective name given to the body of fables, legends or myths which grew up in almost all primitive nations regarding the creation of the world, the origin of man, the powers of nature and the adventures of the gods and heroes. It is natural that in the savage mind such questions should arise as:

What is the world?

What is man?

Who made them?

Whence came all the natural objects about us?

What causes the changes from light to darkness, from heat to cold, from life to death?”

You have been interested in the above paragraph and might be further interested to know that it is but a part of the first paragraph given in our article on MYTHOLOGY. If so, your interest will be augmented in knowing that we give a complete discussion of the ORIGIN OF MYTHOLOGY, GRECIAN AND ROMAN MYTHOLOGY, SCANDINAVIAN MYTHOLOGY and EGYPTIAN MYTHOLOGY.

This discussion will prepare us for still further examination of the subject and we append a partial list of correlated subjects included under “A” in THE NEW PRACTICAL REFERENCE LIBRARY. This work can be continued throughout the alphabet and the material all classified under their respective countries:

Achates, Acheron, Achilles, Actæon, Adonis, Ægis, Æneas, Æolus, Æsculapius, Agamemnon, Aganippe, Ajax, Albion, Alcestis, Ammon, Amphion, Andromache, Andromeda, Antæus, Antigone, Apollo, Argonauts, Argus, Ariadne, Atalanta, Atlas, Augeas, Aurora.

OUTLINE.

I. GENERAL MEANING.

II. DIVISIONS.

1. Myths of explanation to questions asked by primitive man in regard to creation.

a. What am I?

b. Whence did I come?

c. What is the world?

d. Whence came all nature?

e. Causes of light, darkness, life and death, etc.

2. Myths of entertainment.

a. Tales of adventure of gods and heroes.

III. ORIGIN AND THEORIES.

1. Gods were mere men remembered after death by their great deeds.

2. Wise men invented them for the purpose of establishing law, through the gods appealing to mankind.
3. Inventions of poets, story-tellers, etc.
4. Myths explained all physical phenomena.

IV. GRECIAN AND ROMAN.

1. Creation of all things explained by myths.
2. Planets as rulers of universe.
3. Universe divided and rulers take different abodes.
4. Abode of lesser deities.

V. SCANDINAVIAN AND NORTHERN MYTHOLOGY.

1. Explanation of creation.
2. Giant Ymir first created.
3. Bori, father of all gods, appears.
4. Earth then formed from Ymir by Bori's grandsons.
5. Twelve gods and twenty-four goddesses.
6. Gods beneficent and kind.

VI. EGYPTIAN.

1. Many religious myths; not universal as in others.
2. The stronger eventually led.
3. Distinctive belief, soul of man was immortal.

VII. COMPARISON OF DIFFERENT MYTHS.

1. Points of resemblance.
2. Points of difference.
3. Underlying principle same throughout.

QUESTIONS.

What great literary masterpieces are founded on Greek mythology?

What great benefits have accrued to the modern world on account of mythology?

The founding of what city famed in history is based on mythology?

Who was Achilles? Give the story of Hercules.

What was the foundation of mythology? What is its substitute in modern days?

What marked the decline of mythology? What effect would authentic history have upon it?

How does a people outgrow its mythology?

Which are the best-known mythologists?

What are the three systems of interpreting the origin of myths?

Of what monsters was Uranus the father? Who was his wife?

Which of the Titans dethroned his father and what was the ultimate fate of all twelve?

Who dethroned Cronus and became ruler of the world?

What Greek god was identified with the Roman Jupiter?

What was the ancient conception of Jupiter?

Who was next in rank to Jupiter?

What temple on the Capitoline was erected to Juno?

What was the peculiar relation of Mars to the Romans? How is he represented in art?

Who were the parents of Apollo? What did he mean to the Greeks and Romans?

With whom did Diana come to be identified?

What are the varying accounts of the parentage of Venus?

What famous statue and painting represent Venus as issuing from the sea foam?

Who was Mercury's mother? Over what did the god preside?

Who were Vesta and the vestal virgins?

What was the original number of muses?

Who was the muse of comedy?

What goddesses in northern mythology corresponded to the Greek fates?

What did Nemesis personify?

What was the ancient conception of the earth?

What animals were sacrificed to Ceres?

Who were the children of Ceres?

Who has made the Satyr celebrated in art?

What was the Greek hades?

What is a common representation of Neptune?

What expedient did Ulysses use by which he and his crew escaped the Sirens?

What terrible fate befell all those who looked upon the Gorgons?

Into what inanimate object did Zeus change Niobe?

What was Acteon's harsh fate?

In what way was Diana associated with Endymion?

Of what was Psyche a beautiful personification?

Why was Orpheus an important figure in Greek mythology?

Of what was the beautiful Aurora goddess?

What is the interesting vocal Memnon?

In what miraculous way did Perseus escape an early death?

Through whose aid did Jason secure the Golden Fleece?

What famous riddle did Œdipus solve?

Who was the bravest hero of the Trojans killed by Achilles?

What oath were the suitors of Helen compelled to take?

Osiris, representing all that is good, was opposed by what god who was a personification of evil?

Who was Dagon?

From what form of Odin's name is Wednesday derived?

How did Odin inform himself of what took place on earth?

According to Norse mythology which was the first of all things to come to life?

Who was Thor?

What is a vampire?

How is our word tantalize naturally derived from Tantalus?

Correlated subjects: Balder, Freya, Frigga, Lok, Odin, Thor, Tyr, Hercules, Minerva, etc.

The habit of laying up in the memory what has not been digested by the understanding is at once the cause and the effect of mental weakness.

—Sir W. Hamilton.

Next to acquiring good friends, the best acquisition is that of good books. —*Colton*.

Nature Study

There is no subject of greater interest to pupils than the great world of nature, and that teachers may be able to present this subject in a comprehensive way we have arranged this series of lessons. There is no other means of giving pupils so much useful knowledge as to guide them through nature's storehouse.

As directed in your course of study, correlate the various subjects with nature study so that each may help to a proper understanding and appreciation of the other. Do not fail to make every lesson a lesson in LANGUAGE, a lesson in SPELLING, a lesson in PENMANSHIP, and incidentally connect the NUMBER WORK and READING WORK with it all.

MINERALS.

Iron—Discovery, where found, kinds, composition, uses, history, iron-working.

Lead—Production in United States, uses, manner of preparing.

Coal—Classify, anthracite, bituminous, cannel, uses, where found, coke.

Copper—Early uses, nature of, many uses, where found, quantity used.

Gold—Uses: (a) necessities, (b) luxuries; gold beating, gold mining, quartz.

Silver—Five kinds, uses, smelting, eliquation of, amount produced.

Aluminum—Discovery, process of making, nature of, uses.

General topics—Blast furnace, assaying, amalgam.

ANIMALS.

Extinct—Mammoth, mastodon, megatherium, pterodactyl.

Fabled—Chimæra, dragon, griffin, phoenix, roci, mermaid.

Domestic—Camel, dog, cat, cow, horse.

Sea—Whale, seal, walrus, dolphin, coral.

Insects—Fly, mosquito, flea, ant, gnat, butterfly, beetle.

Fowls—Duck, goose, guinea, pigeon, turkey, poultry.

Birds—Jay, robin, carrier pigeon, stork, condor.

Miscellaneous—Prairie dog, frog, dodo, chameleon, monkey.

PLANT.

Fungus—Lichens, mushrooms.

Flowers—Dahlia, geranium, phlox, hollyhock.

Vegetables—Potato, onion, radish, bean, lettuce.

Cereals—Wheat, corn, rye, oats, barley.

Fibers—Hemp, flax, cotton, jute.

Fruit—Orange, lemon, olive, palm, almond, bread fruit.

Forest trees—Pine, mahogany, rosewood, cinchona.

Miscellaneous—Bamboo, tea, coffee, seeds, weeds.

MISCELLANEOUS. (Classify.)

Termites, infusoria, læ, oyster, cork, salmon, orchid, mica, mimicry, mineral work.

Birds

BIRDS

A GREEDY BIRD.

The condor, the great vulture of the Andes of South America, has a voracity so great that it often gorges itself to such an extent that it cannot fly. It has been known to eat eighteen pounds of meat in a day.

LAUGHING BIRDS.

In the Zoölogical Garden of Melbourne, Australia, are strange-looking birds resembling small owls with donkey-like faces. These birds are called laughing jackasses. They perch together in rows and look as if they were very much amused over something. Presently one of them says "Ha," which is repeated by the others until the entire row seems perfectly convulsed with laughter, and people standing by laugh with the birds until the tears run down their cheeks, and they are doubled up by their paroxysms. These birds will not laugh to order. Sometimes they refuse to laugh at all for an entire day.

TEST QUESTIONS ON BIRDS.

- Have birds any teeth? Any ears? How is their food digested?
- Are some birds provided with a complete suit of feathers when hatched?
- Name three striking characteristics distinguishing birds from other animals?
- Flying at the rate of 50 miles an hour how long would it take a duck to travel from Lake Superior to the Gulf of Mexico?
- Can the birds that flit from bush to bush cover long distances in a single flight?
- Why do some of the bones contain air cavities?
- Is there anything unusual about their sense of sight?
- Why does not the perching bird fall when asleep?
- Do birds return to the same neighborhood and frequently to the same nest, year after year?
- Can the female sing?
- Are the best singers the large, brilliant birds, or the small, lively ones?
- How do birds greatly benefit the farmer and fruit grower?
- Name 20 species common to your neighborhood?

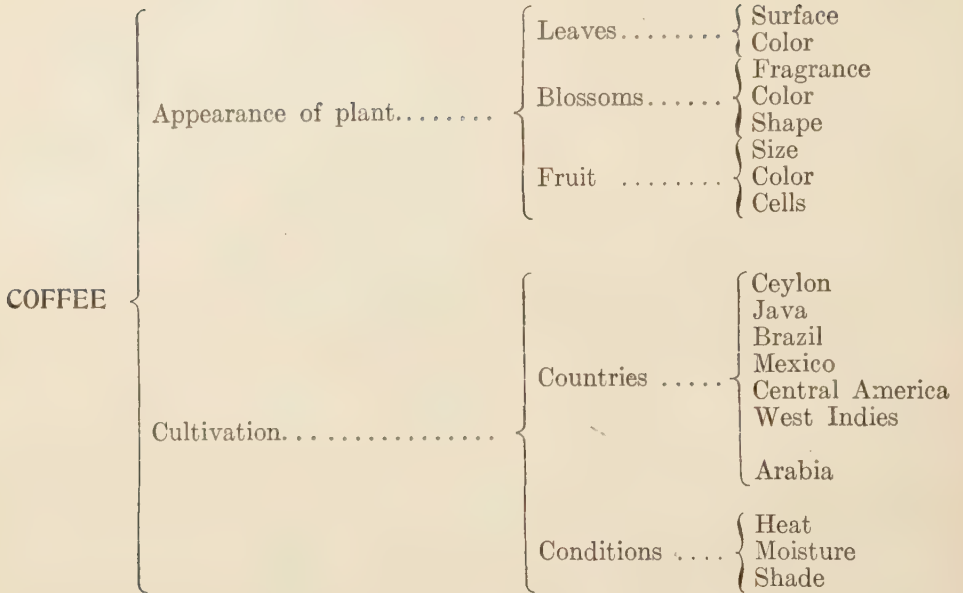
NESTS.

- What bird uses the nest of another in which to lay its eggs? Is this imposition resented and how?
- Are some eggs laid and hatched by the heat of the sun or vegetable matter surrounding them?
- Will the wild turkey leave its nest before the eggs have been skilfully covered?
- What bird lives in the home of the prairie dog?
- What is peculiar about the kingfisher's nests?
- Describe them?
- How do the tailor birds make their nest and why called "tailor birds"?
- What materials do the birds in your neighborhood use in the building of their nests?

EGGS.

- How does the young chick get air while and before hatching?
- Why are some eggs round?
- In what kind of nests are such eggs laid?
- Which end of an egg is the more highly colored?
- What is the shape of eggs, such as the hen's, laid on the ground? How does its shape protect it from blowing away?
- Where are the eggs of sea birds gathered and used for food?
- Ask your family doctor which contains the greater amount of nourishment, an egg or a pound of steak?

Outline on Coffee



TEST QUESTIONS ON COFFEE.

- What is the height of the coffee tree? How would it compare in size with the plum tree?
- What is the average number of pounds of coffee per tree from each crop?
- What country supplies two-thirds of all the coffee used?
- Where does the best coffee come from and what is it called?
- Describe the leaves, the blossoms, the fruit?
- How are the berries gathered? How dried? How is the husk removed?
- How is coffee packed for shipment?
- Of what countries is it a native?
- Who were the first people to extend the cultivation to other countries?
- What conditions are necessary to the growth of the plants?
- Why is great skill and attention necessary in the roasting?
- From what country does the United States get most of her coffee?
- What is the color of the berry before roasted?
- How many trees, with coffee selling at wholesale at ten cents per pound, would it require to make the same amount of money as derived from an apple tree producing ten bushels of apples valued at twenty-five cents per bushel?

Tea

I. DESCRIPTION.

1. Shrub.

a. Height.

When native.

When cultivated.

2. Leaves. (See color plate.)

a. Color.

b. Size.

3. Flowers. (See color plate.)

II. CULTIVATION.

1. Where grown?
2. How many crops yearly?
3. Harvesting leaves.
 - a. Picking.
 - b. Drying.
 - c. Rolling.
 - d. Packing.

2. Black tea. How prepared?
3. Cheap grades. How prepared?
4. Commercial brands.

III. GRADES.

1. Green tea. How prepared?

IV. FOOD VALUES.

1. Beverage.
 - a. What effect on system?
2. Extent of use.

QUESTIONS.

Why is the shrub under cultivation made to branch freely?

What part of the shrub is of commercial value?

How are green and black teas prepared?

Which of the annual harvests yields the best grade?

In what countries is tea cultivated?

May all grades and varieties of teas be prepared from the same plant?

Examine a tea leaf after steeping and compare it with those in the plate shown. Examine a number after steeping and compare them in size with each other.

In what kind of cases is tea packed? Why?

Look at the color plate and point out the parts of the plant.

What is the effect of excessive tea drinking? Is it beneficial in mild quantities? Why? Is it a stimulant?

How are some grades of green tea given their color?

Name some of the brands of tea sold in your town.

Sponge

I. DESCRIPTION.

1. Animal.

- a. Resembles what substance?
- b. Sponge of commerce. What?
- c. Tubes or openings.
 - Use?
 - How located?
 - Number?
 - Extend where?
 - Lined with what?
- d. Stomachs. What? Where?
- e. Food. What? How obtained?
- f. Appearance.
 - Glass-like. Why?
 - Glass-rope. Why called?
 - Venus Flower Basket. Why?

II. SPECIES.

III. PROPERTIES—Sponge of commerce.

1. Light.
2. Tough.
3. Elastic.
4. Porous.
5. Absorbent.
6. Soft.

IV. HOME.

1. Mediterranean Sea.
2. Red Sea.
3. How far below surface?

V. MEANS OF SECURING.

1. Diving.
 - a. Ancient.
 - b. Recent.

2. Spears and prongs.
 - a. Method of seeing below water.
- VI. PREPARATION FOR MARKET.
 1. Decomposition of what?
 2. Cleaned.
 - a. Beaten. Why?
 3. Dried.
 4. Markets. Where sent?
- VII. USES.
 1. Bathing.
 2. Hospital.
 3. Medical.
 4. Domestic.

QUESTIONS—SPONGE.

- What part of the sponge produces the egg?
 What do we mean by a marine animal?
 Do sponges attach themselves to a support?
 What purpose do the openings serve?
 Of what aid to the sponge are the currents of water?
 Does any one tube extend entirely through the body?
 By your own experimenting, prove that a sponge is light, tough, elastic, porous, absorbent, soft, etc.
 Why may sponges become a source of disease? What is the danger in cheap sponges?
 What is known as the fresh-water sponge? What are its habits?
 Give in detail the methods of gathering sponges.
 To what order of animals do sponges belong?
 What are the general characteristics of this order?
 What other animals in this order? In what do they resemble the sponge?
 What is the food of the sponge and how obtained?
 What is their digestive apparatus?
 What are the domestic uses of sponges?
 Of what use are they in the medical profession?

BATS.

- I. GENERAL DESCRIPTION.
 1. Size.
 2. Construction of wings.
 3. Skin.
 4. Eyes.
 5. Nocturnal animal.
 6. Habits.
 7. Food.
 8. Home.
- II. CLASSES.
 1. Flesh-eating—Vampire bats and common kinds.
 2. Fruit-eating.
 3. Species—brown, heavy, big-eared, leaf-nosed.
- III. WHERE FOUND.

QUESTIONS.

- What kinds are common to your vicinity? Where do they live? What do they eat?
 Where and how do bats hibernate?

Where are the flesh-eating bats found? The fruit-eating?
 What enables them to fly?
 Where do they stay during the day?
 Of what use are bats?
 Why do bats hang in clusters, head downward, during their long winter sleep?

Correlated subjects: Fox bat, vampire bat, and all common kinds.

fish and fisheries

GENERAL DESCRIPTION.	(d) Young	Halibut
Heart	FISHING INDUSTRIES.	Mackerel
Blood	United States	Haddock, etc.
Gills	Great Britain	FRESH WATER.
Fins	Canada	Salmon
Scales	SALT WATER.	Trout
Eyes	Shellfish	Whitefish
Vertebrae	Seals	Sturgeon
Bladder or sound	Corals	Eel
Coloring	Pearls	Pickarel
(a) Deep sea	Whales	Bass, etc.
(b) Fresh water	Turtles	FISHING DEVICES.
(c) Breeding season	Sponges	Drawnets
Eggs	FISH PROPER.	Stake-nets
(a) Where laid	Cod	Hooks
(b) How cared for	Herring	Harpoons
(c) Number		

TEST QUESTIONS.

Have fish any ears? Any heart? How do they breathe?
 Is their blood warm or cold?
 What salt-water fish is able to swallow other fish though twice its own size?
 Where are the highly colored fish found? At what season do these colors increase in brilliancy and beauty?
 How many kinds of fish are known to exist now? How many kinds are extinct?
 How do deep-sea fish compare in characteristics with fresh-water fish?
 Where are flying-fish found, and why their name?
 Where are the largest salmon fisheries in the United States? What is the average weight of the salmon?
 How and for what great distances are fresh fish transported?
 Where are the richest fishing grounds in the world?
 What is the most important fish taken from the Atlantic? From the Great Lakes? From the Pacific?
 What salt-water fish are supplied at your market? What fresh-water fish? Name three of each kind.
 Name five species found in the waters of your own neighborhood.
 Why have governments been careful to protect and encourage fisheries?
 Tell how the government restocks certain lakes.
 In what country is fishing the most important industry? Why your answer?
 What remarkable size is attained by certain sharks?

Ants

HABITS.

- 1.
- 2.
- 3.
- 4.

FOOD.

Animal Food
Grains
Honey—dew
Parasites

COMMUNITIES.

Males
Females
Workers
Special workers or soldiers

HOMES.

Ant-hills
Nests
Tree trunks

TEST QUESTIONS ON ANTS.

Does the male ant do any work?
What are the household duties of the female?
What is done with the larvæ on warm days?
Do ants tunnel under rivers and build bridges?
Of what does each community of ants consist?
Which members are wingless?
What are some of the duties of the workers?
Why are some of the workers known as soldiers?
Where and how do most American ants build their nests?
Do they require food in winter?
Why do ants sometimes herd lice on plants?
How do they draw the sweet fluid from these parasites?
What are some of their acts which show wonderful intelligence?
How do some species dispose of their dead?
Why is the *umbrella* ant so called?
How does the *honey* ant come by its name?
Name some of the peculiarities you have noticed in your observation of ants.
What are white ants?
Proportionately, how much stronger would you say ants were than some of the large animals like the bear, the elephant?

ARMIES OF ANTS.

The bashikouay ants march through the forests of Central Africa in armies, often several miles in length. Along the lines are officers, who keep the army in order. If they come to a place where there are no trees they build underground tunnels, for they cannot bear the heat of the sun. When they are hungry they devour everything that comes in their way, large animals as well as small, and the negroes run for their lives. They will not touch vegetable matter, but vermin is destroyed instantly. All the insect world flies before an army of this kind.

When these ants want to cross a stream they form a living bridge with their own bodies over the water. This is done by a great number of ants, each clinging with his fore-claws to his next neighbor's body. Over this living bridge the whole army of ants march in order.

—Morton.

Bees

CLASSES.

Solitary.

- (a) Mason-bee
- (b) Carpenter-bee

Colony or Society.

- (a) Honey-bee
- (b) Bumble-bee

Eggs.

Size

Color

Shape

Where deposited

(a) For workers

(b) For drones

(c) For queens

Time for hatching

SPECIES.

Honeybee

Bumblebee

Swarm.

Number

Queen

Drones

Workers

Habits.

Flight

Honey gathering

Forming new swarms

TEST QUESTIONS.

What is a worker? A drone? A queen?

Could clover be successfully raised without the aid of bees? Why not?

How many queens are there in each swarm?

How many eggs does she lay in a single day?

What distinction is made between the eggs that give birth to *workers* and those that give birth to the *drones*?

Are the eggs which are to develop into queens laid in cells differing from the others?

On what is the queen fed?

Why are the drones so called?

How do the workers compare in numbers with other classes in the swarm?

In how many days do the eggs hatch?

How long and by what class are the larvæ fed?

When do the workers seal the larva up in the cell?

How long before it comes forth a bee?

When is a new queen allowed to appear in the swarm?

What becomes of the old queen?

What do the bees do in the winter?

Food of bees:

What is it?

How obtained?

How stored?

Enemies of the bee:

1.

2.

3.

4. Name them.

What plants furnish the most desirable honey?

AN ENEMY OF THE BEE.

A remarkable bird found in Mexico is the bee martin, which has a trick of ruffling up the feathers on the top of its head into the exact semblance of a beautiful flower, and when a bee comes along to sip honey from the supposed flower it is snapped up by the bird.

QUESTIONS.

- How long is the alligator when fifteen years old? When full grown?
Were you born the same year with an alligator and lived to be 100 years old, what stage of growth would the reptile then have reached? Does the alligator outlive the elephant? The whale? The turtle? The camel?
How many dozen eggs are laid by the female? When and how are these hatched?
What animal does the alligator resemble?
Do alligators hibernate?
What is the disposition of the alligator?
Where do they eat their prey?
What is alligator leather used for?

Cork

TREE.

- From what species of trees is cork obtained?
In what countries does it grow?
How old must the tree be before it produces?

BARK.

- What part of the tree yields the cork?
Is the first stripping the best quality?
How many years does it take the tree to grow a new bark?
Is it the outer or the inner bark that produces the cork?
What is the thickness of this bark?
How is it removed from the tree?

USES.

- What are some of the qualities of cork?
Why is it especially serviceable for the stopping of leaks in vessels?
In what other ways is it used?

CUTTING.

- How many grades of cork are there?
What is done with cork to prevent its taking the temper out of knives that slice it up?
How many hundred times a minute does the disc-shaped knife revolve?
How many thousand corks can be cut a day?
How are the corks sorted for shipment?

Birch

VARIETIES.

Cherry birch
Black birch
Yellow birch
Paper birch

Dwarf birch

USES.

Timber
Furniture
Fish casks

Hoops

Wooden shoes
Paper
Canoes
Boxes

QUESTIONS.

- What furniture have you, made from birch?
In what continents does the birch tree grow?
Describe its wood. Its bark.
What are some of the uses of the bark?
Why are fishing nets and sails steeped with it?

How is the oil used in Russia?

What can be made from the sap?

What variety furnished the bark from which Indians made their canoes?

Orange

DISTRIBUTION.	TREE.	FRUIT.	HARVEST.
Asia	Height	Shape	Picked
Europe	Branches	Color	How
Africa	Leaves	Kinds	When
Australia	Flowers	Navels	Sorted
United States	Color	Blood orange	Packed
Florida	Fragrance	Russets	Shipped
California.	Shape	Mandarin	

TEST QUESTIONS.

What was the kind of orange you ate for breakfast? Where was it raised—in California or Florida? How can you tell?

How many kinds are kept at your grocer's store or nearest fruit stand?

Looking at the color illustration, what do you see remarkable about it?

Is it true of the apple to see ripe fruit and blossoms at the same time?

Why does the navel orange recommend itself to the consumer?

Of what country is the orange a native?

From what South American country was the orange introduced into California?

What is the height of the cultivated tree?

Name three of the most common varieties. Describe each in detail. Which is in the greatest demand in the United States?

Why is the blood orange so called? What is a mandarin?

Why are orange blossoms so popular with brides on their wedding day?

How many million trees are found in California? Florida?

How are oranges harvested, packed, and shipped to market?

What can you say of the orange as to food value?

Apple

TREE.	FRUIT.
1. Height.	1. Size.
2. Bark.	2. Shape.
3. Branches.	3. Color.
LEAVES.	4. Skin.
1. Shape.	5. Pulp.
2. Color.	6. Core.
3. Size.	7. Seeds.
BLOSSOMS.	8. Cells.
1. Color.	VARIETIES.
2. Fragrance.	1. Known in United States.
3. Size.	2. Number profitable.
4. Shoots.	3. Successful in any one locality.
USES.	SEEDLESS AND CORELESS APPLE.
1.	1. Color.
2.	2. Flavor.
3.	3. Size.
4.	4. Appearance.
	5. Blossomless tree.

QUESTIONS ON THE APPLE.

- To what family does the apple tree belong?
 Of what continent is it a native?
 What people introduced the apple into England? Into the United States?
 What continent now leads in its production?
 How many barrels will one tree yield in a season under favorable conditions?
 From what two species have the two varieties been derived?
 How many cultivated varieties of apples are known?
 How many cultivated varieties are grown in the United States?
 How many of these are profitable?
 How many varieties are successful in any one locality?
 Do the seeds produce the fruit from which they are taken?
 How is vinegar made from apples?
 Name five varieties found in your orchard or in the grocer's store?
 How are orchard trees prepared?
 What is grafting?
 What states have the largest number of trees? What states produce the largest quantity of fruit?
 Why is clover sown in an orchard to insure a good crop?
 How many apple trees are there in the United States? How many barrels does the yearly crop amount to?
 Who has succeeded in growing the seedless and coreless variety of apples?
 What is peculiar about the skin of these apples?
 Why is the blossomless tree an important feature of this variety?
 What danger is removed by the lack of the flower?
 What are the indications that the seedless apple will in time displace all the old seed-bearing varieties?

Ostrich

DESCRIPTION.	Wings	Speed
Size	Color	Eggs
Height	(a) Of male	(a) Where laid
Weight	(b) Of female	(b) How hatched
Feathers	(c) Of chicks	(c) Number
(a) Of male		
(b) Of female		
	CHARACTERISTICS.	OSTRICH FARMS.
Head	Food	California
Eyes	Wild state	Arizona
Beak	Domesticated	South Africa

TEST QUESTIONS ON OSTRICH.

- How does the weight and height of a full-grown ostrich compare with the weight and height of an average-sized man?
 Of what country is the ostrich a native?
 Are the wings of any use to the bird?
 How fast can the ostrich run? Could it outrun a fleet horse?
 What is the color of the feathers of the male? Female?
 How are the eggs hatched in warm countries?
 Does the male aid in hatching the eggs?
 At what age do the birds attain their full growth?

Where are ostrich farms established in the United States?
 For what purpose are these farms established?
 What is the value of ostrich feathers? Why are they so greatly prized?

Dogs

- I. DESCRIPTION.
 1. Size.
 2. Structure.
 3. Appearance.
 4. Characteristics.
- II. USES.
 1. Hunting.
 2. Protection.
 3. Commercial purposes.
 - a. Leather.
 - b. Miscellaneous.
 4. Transportation.
- III. CLASSIFICATION.
 1. Wolf Dogs.
 - a. Newfoundland.
 - b. Eskimo.
 - c. St. Bernard.
 - d. Shepherd.
 2. Watch Dogs.
 - a. German boarhound.
 - b. Danish dog.
 - c. Matin dog.
 3. Greyhounds.
 - a. Scotch.
 - b. Italian.
 - c. Irish.
 - d. Turkish.
 - e. Russian.
 4. Hounds.
 - a. Bloodhounds.
 - b. Foxhound.
 - c. Staghound.
 - d. Setter.
 - e. Pointer.
 - f. Spaniel.
 - g. Poodle, etc.
 5. Cur Dogs.
 - a. Fox terrier.
 - b. Skye terrier.
 - c. Scotch terrier, etc.
 6. Mastiffs.
 - a. Bulldog.
 - b. Pug-dog, etc.

QUESTIONS.

Where are wild dogs found?
 Why are bloodhounds so named?
 What remarkable intelligence is displayed by the collie?
 What other animals are included in the type to which the dog belongs?
 How do dogs compare with other animals in affection and intelligence?
 Which family of dogs furnishes the largest specimen? What is its weight?
 From what does the St. Bernard derive its name?
 What use did the monks of St. Bernard make of the dog?
 How was the Newfoundland dog made use of in his native land? What are some of his strong points? Why does he make a good watch dog?
 What great English painter used the Newfoundland dog as a subject for one of his famous paintings? (which see.)
 Which is the most celebrated of all strains of shepherd dogs? What points show that it is adapted to outdoor life? Of what assistance is it to the shepherd?
 What is the size and build of the Eskimo dog? Of what use is it in the Arctic regions? How many miles a day can it travel?
 What is the most distinguishing feature of the greyhound? Has the name any reference to its color? From what is the name derived?
 What special sense marks the difference between the hound and the greyhound?
 Which shows the most affection for man, the smooth-haired or the rough-haired variety?

Silk

- I. SILK MOTH.
 1. Description.
 - a. Body.
 - b. Legs.
 - c. Wings.
 - d. Number of eggs.
- II. SILK WORMS. (Wild.)
- III. SILK WORMS. (Culture.)
 1. Eggs.
 - a. Number.
 - b. Deposited when?
 - c. Temperature for hatching.
 - d. Time of incubation.
 2. Caterpillars.
 - a. Early appearance.
 - b. Care.
 - c. Food.
 - d. Development.
 - e. Casting size.
 - f. Body.
 - Segments.
 - Legs.
 - g. Mouth.
 - h. Color.
 3. Cocoon Development.
 - a. Racks.
 - b. Tubular glands.
 - c. Spinneret.
 - d. Time.
 - e. Length of thread.
 - f. Hatching.
 - Time required.
 - Prevention of.
 - g. Proportionate weight in silk.
 4. Origin of Industry.
- IV. MANUFACTURE.
 1. Unwinding cocoons.
 2. Reeling silk.
 - a. Description of process.
3. Raw Silk.
 - a. Why and when washed?
 - b. How wound?
 - c. How assorted?
4. Throwing—Necessary before weaving.
 - a. Spinning, twisting, reeling.
 - b. Usually done by machinery.
 - c. Regulation of twist.
 - d. Single.
 - e. Sewing silk.
5. Doubling.
 - a. Tram silk.
 - b. Threads twisted in one direction.
6. Organzine.
 - a. Threads twisted in opposite directions
 - b. Hard silk.
7. Weaving.
 - a. Modes.
 - b. Peculiarities.
 - c. Intricacies.
8. Waste Silk.
 - a. Consists of what?
 - b. Processes.
 - c. Use.
- V. COUNTRIES.
 1. Raw Silk.
 - a. China, Japan, Italy, France.
 2. Manufactured Silk.
 - a. France, Germany, Switzerland, United States.
- VI. COLORED PLATE.
- VII. ARTIFICIAL SILK.
 1. Composition.
 2. How produced.
 3. Value.
 4. How extensively used?

QUESTIONS.

Turn to the color illustration and follow the development of this useful insect through its life. What do you see remarkable about some cocoons?

Give three reasons why silk is more expensive than cotton.

Name five materials made from silk in your home.

What people originated the silk industry? Are the people of this country still engaged in it?

What is the length of thread furnished by a cocoon? For what part of a mile would it stretch?

Why are not the cocoons intended for silk permitted to hatch? How is this prevented?

How many pounds of cocoons are required to yield one pound of raw silk? How many pounds of cocoons will an ounce of silk worms' eggs produce?

How are the eggs hatched artificially? What temperature is necessary? What is the time required? What is the food given and how prepared?

During the caterpillar stage of eight weeks how many times does the worm cast its skin?

How many legs has the caterpillar? With what are some provided?

When does the caterpillar become lazy and refuse to eat? When does it begin to spin its cocoon? How long does this take?

What are the leading silk-producing countries? Silk manufacturing?

What people have been the most ingenious in the invention of looms?

What is artificial silk? How is it made? How does it compare with natural silk in durability? In beauty?

Coral

I. DEFINITION AND DESCRIPTION.

II. FORMS.

1. Tree.
2. Organ pipe coral.
3. Brain.
4. Reef.
 - a. Where found?
 - b. Construction.
 - c. Characteristics.
 - d. Atoll.

III. COLORS.

1. Pure white.
2. Pink.

3. Red.

4. Black.

IV. CORAL FISHERIES.

1. Location.
2. Methods.

V. COMMERCIAL VALUE.

1. Jewelry.
 - a. Necklaces.
 - b. Other ornaments.

VI. MARKETS.

1. Naples.
2. Genoa.

QUESTIONS.

What enables the coral insect to cling to the rock and draw food into its stomach?

What part of the insect becomes a contribution to the coral formation?

What is coral? What is a polyp?

Why is the tree coral so called? How is it formed?

Describe the organ pipe coral.

Which species of coral is most widely distributed?

What is interesting about the brain coral?

Which varieties are prized for jewelry?

Where are these varieties found?

Off what coasts are coral fisheries maintained?

What two cities are the chief centers of the coral industries?

What determines the value of coral?

Why is it that the coral polyp never builds to the surface of the water?

How are the upper portions of the reef built up?

Why do coral reefs take a circular form?

How do we know that the coral polyps have been working for many ages?

Correlated subjects: Coral Fish. Coral Sea. Coral Tree. Atoll.

Elephant

I. DESCRIPTION.

1. Size.
 - a. Height.
 - b. Weight.
2. Physical Construction.
 - a. Limbs.
 - b. Head, neck.
 - c. Trunk.
 - d. Skin.
 - e. Tusks.
3. Intelligence.
 - a. Teachableness.
 - b. Keen memory.
4. Disposition.
 - a. Timid.
 - b. Obedient.
 - c. Patient.

II. SPECIES.

1. Asiatic.
2. African.

III. HABITS.

1. Lives how? Where?
2. Rarely bred in domesticity.
3. Great swimmer — delights in water.
4. Food.

IV. DOMESTICATION OF THE ELEPHANT.

1. Plan of capture.
2. Methods of training.

V. USES.

1. Beast of burden.
2. War.

VI. VALUE.

1. Commercial.
 - a. Ivory.
 - b. Menageries.
 - c. Training.

QUESTIONS ON ELEPHANT.

How does the elephant compare in size with other animals?

How does the Asiatic elephant differ from the African?

Why is the African elephant seldom seen in captivity?

What is the greatest height to which elephants attain? What is their usual height?

What is their weight? Describe the body. The legs. The toes.

What is the most remarkable feature of the elephant? What is peculiar about the skin?

What use does the elephant make of its trunk?

Why are the tusks valuable? How much do they weigh?

Is the elephant's brain large or small in proportion to the size of its body?

How does the elephant compare with other animals in intelligence?

Which ones separate themselves from the herd and live solitary lives?

Why are these called rogues?

In what ways are wild elephants caught?

How are trained elephants used in capturing wild ones?

What great warrior had with him an army of elephants when he invaded Italy?

In what country have the animals been used to the greatest extent?

What part do they take in occasions of pomp and display?

How are they of use in lumbering?

INTERESTING FACTS ABOUT THE ELEPHANT.

To give lightness to what would be otherwise an insupportable weight, the cranial bones contain numerous large air cells.

Elephant feet are considered a great delicacy by some African tribes.

Bear

I. GENERAL DESCRIPTION.

1. Construction.

- a. Head.
- b. Body.
- c. Limbs.
- d. Size.
- e. Weight.
- f. Fur, etc.

2. Habits.

- a. Home.
Winter.
Summer.

b. Hibernation.

c. Care of young, etc.

3. Food.

4. Disposition.

II. SPECIES.

1. Name seven.

a. Characteristics.

b. Where found.

III. USES AND VALUE.

1. Food.

2. Fur, etc.

QUESTIONS.

How does the weight of a grizzly bear compare with that of a horse? A cow? How does the grizzly differ from other kinds of bear?

With what other animals have bears many features in common?

Why does the body of the bear appear more bulky than it really is?

In what way does the bear use its claws? What is peculiar about the movement of bears? Where do they usually make their homes?

Which species live almost entirely on fish?

In what ways is the bear of commercial value?

How does the polar bear differ from all the others? Why are its feet hairy on the soles?

Which kind of bear would it be most dangerous for you to meet on a hunting trip?

How could you easily identify the spectacled bear were you traveling in the Andes? Why so called?

How could you tell a honey bear? Where are honey bears found? Why so named?

What species of bear would you find on a hunting trip into northern Michigan? Into Canada? Into the Rocky Mountain regions? Into Kadiak Island, Alaska? Into the Arctic regions?

Which species is the most widespread?

Where is the home of the barren-ground bear?

Why is the Kadiak bear so called?

CACAO TREE.

I. WHERE FOUND.

1. Native.
2. Cultivated.

II. DESCRIPTION.

1. Tree.
2. Fruit.
 - a. Pods.
 - b. Seeds.

III. PRODUCTS.

1. Cocoa.
2. Chocolate.
3. Cocoa Butter.

IV. USES.

1. Drinking purposes.
2. Confections.
3. Medicinal.

USES OF THE BEAR.

The natives of Kamchatka are indebted to the bear for many things which to them are the comforts of life. Beds, coverlets, bonnets and gloves are made from the skin; the flesh is used for food, as is also the fat; the intestines are used as a substitute for glass in windows and as masks for protecting the face from the glare of the sun; the shoulder blades are used for scythes to cut grass.

—Morton.

QUESTIONS.

By what process is the commercial chocolate made? Cocoa?
Where are these articles used largely as a beverage?
What is the commercial importance of each?
What per cent of fat do the seeds contain?
What element does chocolate contain that is lacking in cocoa?
How is cocoa butter used medicinally?
Describe the pod. How many seeds does it contain?
Give preparation of chocolate for shipment.
What is the height of the cocoa tree? What are the uses of cocoa butter?
First used in what country? What is the size of the cocoa bean?
Why are the beans roasted? How are the nibs reduced to paste?
How is the paste prepared for use?

Cocoanut

- | | |
|-------------------|-------------------------------|
| I. WHERE FOUND. | e. Milk. |
| 1. Native. | f. Food. |
| 2. Cultivated. | III. PRODUCTS OF NUT. |
| II. DESCRIPTION. | 1. Oil (cocoanut butter). |
| 1. Tree. | a. Soap. |
| a. Name. | b. Candles. |
| b. Height. | 2. Cups, ladles, etc. |
| c. Leaves. | IV. PRODUCTS OF TREE. |
| 2. Fruit or nuts. | 1. Food—bud at top of tree. |
| a. Size. | 2. Sap—wine. |
| b. Shape. | 3. Leaves—to thatch cottages. |
| c. Husk. | 4. Fibers—mats, cordage. |
| d. Meat. | 5. Trunk—boats, timbers, etc. |

QUESTIONS.

What part of the tree is made into wine? To what practical uses has the tree been put? The cocoanut?

Why is the fluid within the nut called milk? What is made from the trunks of the trees?

When do the trees begin to bear fruit? How long do they continue to produce?

For how many years does the cocoanut tree continue to bear without any attention?

How has the tree distributed itself to the tropical islands? What are some of the things made from the fiber?

What are the principal uses of the shells? The oil? The fruit? The leaves?

Cotton

- I. VARIETIES.
 - 1. Long fiber or sea island cotton.
 - 2. Short fiber or upland cotton.
- II. WHERE RAISED.
 - 1. United States.
 - a. Sections.
 - 2. Foreign Countries.
 - b. Names.
- III. PLANTING.
 - 1. Methods.
 - a. Rows—distance apart.
 - b. By what means.
 - 2. Season.
- IV. CULTIVATION.
 - 1. Soil.
 - a. Sandy loam—lime and phosphates.
 - b. Heavy rainfall while planting.
 - 2. Dry season, to mature.
 - 3. Temperature.
 - a. Not less than a mean annual temperature of 60 degrees.
- V. HARVESTING.
 - 1. Time.
 - a. Bursting of pods or bolls.
- 2. Picked by hand. All bolls not ripe at same time.
- 3. Sent to gin house.
 - a. Seeds removed by cotton gin.
 - b. Pressed into bales of 500 lbs. each.
- VI. SEAPORTS, RAW MATERIAL.
 - 1. United States.
 - 2. Foreign.
- VII. FACTORIES.
 - 1. United States.
 - 2. Foreign Countries.
- VIII. PRODUCTS.
 - 1. Cloth.
 - a. Clothing.
 - b. Household furnishings.
 - 2. Cottonseed Oil.
 - 3. Fodder and Fertilizer.
 - a. Seeds from which oil has been pressed ground into powder.
- IX. HISTORY AND GROWTH OF COTTON INDUSTRY.
 - a. Domestic.
 - b. Foreign.
- X. COLORED PLATE.

QUESTIONS.

What eight states lead in cotton production? What states make up the cotton belt?

At \$50 per bale how does the cotton crop in the United States compare in value with the corn crop at 40 cents per bushel?

Which variety of cotton is most extensively cultivated in the United States?

What is the average height of the upland plant? Of the sea island?

From what does the sea island cotton take its name?

When and how are cotton seeds sown? How is cotton cultivated?

How long after the flowering has commenced until the seeds open?

How is cotton harvested? How is cotton separated from the seeds?

What is the oldest cotton-growing country? Who introduced the cotton shrub into Europe?

Where and when was cotton first planted in our country? What countries raise the world's supply?

What are our leading cotton ports?

How did the invention of the cotton gin affect the production of cotton?

Who invented the cotton gin? In what form is the cotton sent to the manufacturer?

How are cotton seeds utilized? What is the weight of a bale?

How much of the world's cotton is raised in the United States?

Name five materials made from cotton found in your home.

frog

- I. TADPOLE.
 - Young frog.
 - 1. Description.
 - a. Head.
 - b. Tail.
 - 2. Transformation.
- II. MATURE FROG.
 - 1. Where found?
 - 2. How breathe?
 - 3. Movements.
 - a. Water.
 - b. Land.
 - 4. Food.
 - 5. Commercial value.

Toad

- I. TADPOLE.
 - Young toad.
 - 1. Transformation.
(See Frog.)
 - 2. Food.
- II. MATURE TOAD.
 - 1. Description.
 - a. Where found?
 - b. Color.
 - c. Warts.
 - d. Species.
 - e. Food.
 - Kinds.
 - Mode of ob-
taining.
 - f. Movements.
 - g. Uses.
 - Pet.
 - Destroys in-
sects.
 - h. Poisonous?

Lizard

- I. DEFINITION.
- II. DESCRIPTION.
 - 1. Limbs.
 - 2. Body.
 - 3. Tail.
 - 4. Glands—pecu-
liarity?
- III. SPECIES.
 - 1. Number?
- IV. WHERE FOUND.
- V. FOOD.
 - 1. Vegetable.
 - 2. Animal.
- VI. HABITS.
- VII. FAMILIES.
 - 1. Skinks.
 - 2. Geckoes.
 - 3. Iguanas.
 - 4. Chameleons.
- VIII. GILA MONSTER.

QUESTIONS.

By what means does the toad procure its food?
What is the breeding-place of the frog and toad?
How does the food of the tadpole differ from that of the mature frog? The mature toad?
How are frogs' legs regarded as a food? To what industry has this led?
Why are the toad and frog classed as amphibians?
What becomes of the tail of the tadpole?
Of the following points mention those that are common to both the toad

TEST QUESTIONS ON OWL.

How were owls regarded in olden times?
What bird was sacred to Minerva and mentioned frequently in literature?
Is the owl entitled to the wisdom its look gives it?
What is characteristic of the owl's body?
To what peculiar feather formation about the eyes is due the owl's credit of wisdom?
What is peculiar about the owl's flight?
In what respect are the owl's toes similar to the human hand?
Where are owls during the day? Where do they nest? How many eggs are laid and what is their color?
What specimen is the most common?
What kind lives in company with rattlesnakes? In the home of the prairie dog?

A QUEER LIZARD.

In Australia is found the frilled lizard about two feet long including its tail. The loose skin about its throat, it can by some peculiarity erect to look like the broad lace collars of Queen Elizabeth's time. When frightened or startled this lizard rises on its hind legs and jumps like a kangaroo.

Butterflies

DESCRIPTION.

Head.
Antennæ.
Eyes.
Tongue.
Thorax.
Legs.
Wings.
Number.
Structure.
Abdomen.

2. Caterpillar.
Definition.
Number of segments or rings.
Number of legs.
Covering of body.
Number of eyes.
Movements.
Food.

3. Chrysalis.

4. Insect.

CLASSIFICATION.

Known Species.
In the world.
In United States.
In your neighborhood.
American Families.
Brush-footed.
Metal marks.
Blues.
Swallowtails.
Skippers.
Coppers.
Hair streaks.

COLOR AND SIZE.

Male.
Female.
Temperate regions.
Tropical regions.

LIFE HISTORY.

I. Eggs.
How and where laid.
Time required for hatching.
In cold countries.
In tropical climates.

QUESTIONS.

What protection does nature provide the butterfly?
How many thousand kinds are known in the world? In the United States?
In what three ways do butterflies differ from moths?
Where are butterflies found whose wings measure eight inches from tip to tip?
How many legs has a butterfly? How many wings?
To what part of the body are the legs and wings attached?
On what do butterflies feed? How is their food obtained?
Name the five different families under which the North American butterflies are classed.
How do the species of the tropical countries compare with those of the temperate latitudes?
How and where are the eggs deposited? What is the period of incubation in warm countries during the summer months? In colder countries?
Do caterpillars ever eat flesh?
What is the duration of the larva stage in temperate climates? In cold regions?
In how many ways do caterpillars attach themselves to leaves?
How does the insect breathe in the pupa state?
How long does the pupa state continue?
What is the appearance of the imago when it comes out of the chrysalis?
How long before it becomes perfect and is ready for flight?
What is the best-known species of your own neighborhood? Name three.

and the frog, and those in which they differ: Home, appearance, tadpole stage, construction, breeding and food.

In what respect does the lizard resemble the frog or toad? In what respects do they differ?

What climate is adapted to the lizard?

What is their food?

Do the young resemble the mature lizard?

Why is the lizard classed among the reptiles?

How many species are there?

What is the Gila monster? Where found? Why dreaded?

ANIMALS.

What animal has eyes on the ends of its horns, has one foot and moves very slowly?

Name a dozen different animals of your county, wild or domesticated.

How does the beaver build houses, gnaw down big trees and build dams? What feature has the beaver in common with the bee?

Where is the bandicoot rat found? How large is it? How is its flesh considered by the natives?

The cruel treatment to which the badger was once subjected gave rise to what word now in common use?

In what way is the earthworm of great help to the farmer?

What is a common practice of the fox at time of capture?

How do you pronounce "coyote?" What is its size?

Where are gorillas found? What do they eat?

Why has the dolphin been celebrated by poets?

What are anthropoid apes?

In what particular attitude do bats remain through winter?

To what uses is the buffalo put in India?

What is the average burden carried by strong camels and their rate of speed? What is the usual length of a camel's life?

Where is it supposed that cats were first domesticated?

In what country are there no deer?

When does a dog's growth cease and what is the highest limit of dog life?

What are the methods of capturing elephants, singly or in groups?

What is the height of the tallest of all animals?

What ancient people considered the hippopotamus a god?

From what comparatively small animal has the horse developed in the process of evolution?

Characteristics of what two animals are combined in the mule?

What is the general structure of the seal?

For how many centuries has whale fishing been an important industry?

What kind of ivory is preferred by dentists, and why?

Why don't the larger animals migrate instead of hibernating?

In what respects do mammals (milk-givers) differ from all other animals?

What products of a whale are of commercial value?

Give some characteristics of the rabbit. For what is it valued? In what country is it so plentiful as to be a menace?

Has the squirrel any commercial value?

Name all the common animals you know whose fur is used in the fur trade. How is it prepared and used?

What is the muskrat noted for? Where is it found?

What are the uses made of the different parts of the hog?

Why has the giraffe a small head?
 From what source is angora wool obtained? What is astrakan wool?
 Are coon skins used in the fur trade?
 Name the uses to which all parts of the cow are put.
 Which is the more useful when alive, the horse or cow? When dead?
 Age of Whales—The age of whales is ascertained by the size and number of laminae of the whalebone, which increases yearly. Ages of 300 and 400 years have been assigned to whales from these indications.

BIRDS.

From what does the bobolink take its name? When does the bobolink lose his brilliant colors, become very fat and esteemed for his delicate flesh? What famous poet wrote a lyric about this bird? What is the color of its eggs? (See color plate.)

How does the albatross sleep in midocean? What happens when food is plentiful? How does it rank in regard to size?

How is the color of the canary bird brought about?

On how many national ensigns does the eagle appear?

What is remarkable about the speed of the road runner?

What are the most expensive feathers and why are they so rated?

What are the eight orders into which birds are divided?

What fossils prove an evolution of birds from reptiles?

When was the canary introduced into Europe?

What is the highest record for distance traveled by carrier pigeons recently made by an American pigeon?

From what eastern countries did all species of fowl originate?

What is the common wild goose of the United States?

How many species of humming birds are now known?

To what great age do parrots live?

What are some of the characteristics of the ostrich?

What are the birds of prey? Where is their home, and in what sense are they valuable?

What nation values the nest of the bird known as the swift as a food? Of what is it made?

What birds remain in the temperate zone all winter?

What is the cause of the migration of birds?

How do the birds of paradise get their name?

What is remarkable about the eider duck's down? What is the size of the duck? Where is it found and for what greatly prized?

FISH

How do oysters eat?

How would you distinguish an oyster from a clam? In what latitude are oyster beds found? At what age does the oyster attain its growth?

Describe the method of attack on oysters by the starfish.

Name the three varieties found in your home market.

What is the appearance of the oyster eggs?

As oysters develop what is one of their striking peculiarities?

Where would you fish for large-mouthed black bass, in lakes or streams? For the small-mouthed variety?

Where are bass caught weighing from 300 to 400 pounds?

What is peculiar of the balloon fish?

What city eats bluefish every year to the value of a quarter of a million dollars?

Where are blind fish found? How do you account for their blindness?
 In what way does the archer fish capture insects several feet above the surface of the water?
 How is cod fishing carried on? How many thousand hooks are put out by a single schooner?
 For what unusual time can cuttle fish remain alive out of water?
 Where is the greatest reservoir for the special cultivation of cod?
 What three expeditions have contributed much to the knowledge concerning fish?
 What effect have electrical fishes upon man?
 For what is the flying fish noted?
 What is the average size and weight of a salmon?
 What variety of the clam has the largest shell known?
 Which two countries are the chief centers of the oyster industry?
 What are kitchen middens, and where do they occur?
 Name five kinds of fish common to the waters of your vicinity.

INSECTS.

Which does the biting, the male or female mosquito? How do mosquitoes spread disease? Describe the process in detail.
 There are how many thousand species of bees?
 How do ants capture other insects and use them as milch cows?
 In how many remarkable ways does the beetle protect itself? Is any part of the globe free from this insect? How many thousand species are known?
 What enables the fly to walk on the ceiling?
 On what did the potato bug feed before the cultivation of this vegetable?
 What is its other name?
 What people relished baked locusts for food?
 How do grasshoppers produce their chirping noise?
 During what seasons are chinch bugs most destructive? Describe their method of attacking wheat and other grains. What enormous damage do they cause yearly?
 What peculiarity gives the army worm its name?

REPTILES.

To what remarkable length does the anaconda grow? Where is this snake found?
 On what was it thought for a long time the chameleon lived? How does it change its color?
 At what period of its existence does the frog live on its tail?
 Why did the ancient Egyptians preserve the body of the alligator with the same care given the human body?
 How is a rattlesnake's rattle produced?
 What is the most important species of turtle? What is the weight of these?
 The length?
 Where does the lizard lay its eggs only to abandon them?
 What is the Gila monster? Where is it found? Is its bite deadly to man?
 Which is the only one of the thousand species of lizard that is venomous?
 What commercial value has the alligator?
 To what class of animals are reptiles most closely related and how do they differ?
 What part of the frog is relished as a food?

The most helpful books are those that in our early years serve as lights to pilot us into the wide harbor of the world's wisest and most inspiring literature.

—James Wallingford.

Psychology and Pedagogy

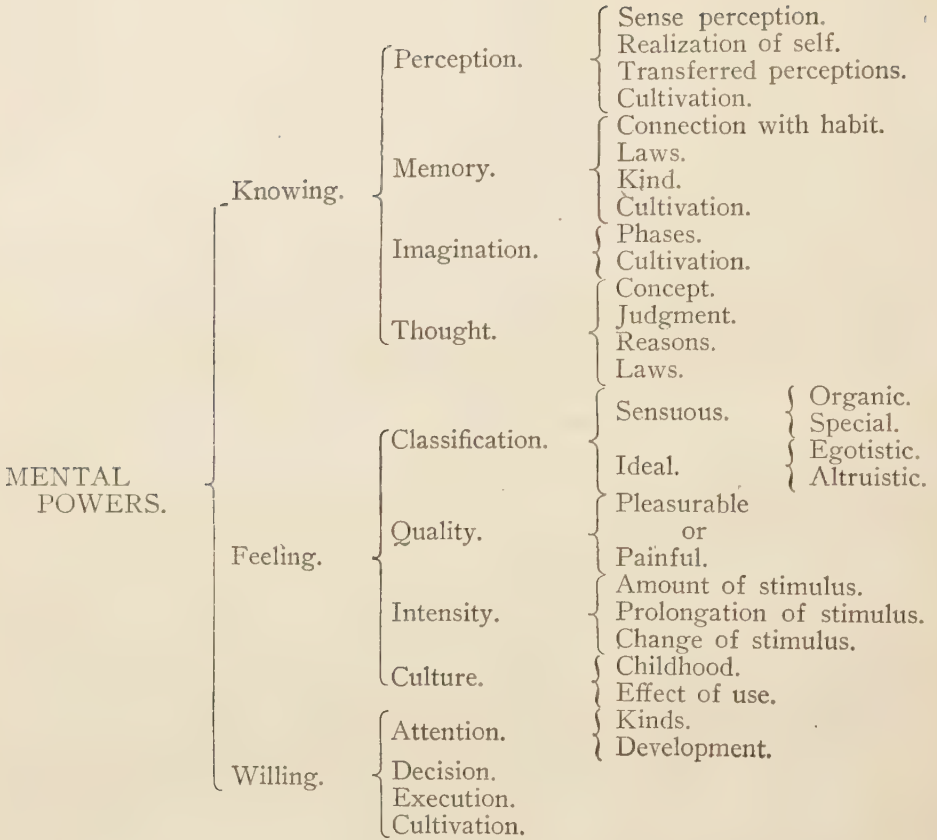
Psychology and *Pedagogy* are connected with those movements in education which deal directly with the student and the teacher. The foundation for this division is psychology. The general article on this subject is written from the viewpoint of the teacher and for the purpose of assisting those who are interested in learning the fundamental principles of this science and using them as a foundation for their methods in teaching. The articles on each of the important subdivisions, such as *Perception*, *Attention*, *Memory* and *Imagination*, contain directions for training the mental power described in the article. Not only teachers but parents will find these directions of great service.

The general article *PEDAGOGY* is in the main historical, giving a sketch of the pedagogical theories of the different periods of history and showing how one developed from the other and how the methods which are now in general use are the outgrowth of the principles and systems established by leading educators in the sixteenth, seventeenth and eighteenth centuries.

The general article *Methods of Teaching* is founded on the principles of psychology set forth in the general article on that subject, and the subordinate articles pertaining to it, such as *Memory*, *Imagination* and *Reason*. This article deals with the foundation principles of teaching which are applicable to the teaching of all subjects. Following this are descriptive articles on the two general methods known as the *Inductive Method* and the *Deductive Method*. The articles on special methods have a decidedly practical turn and show teachers how to proceed in a scientific and systematic manner in the teaching of the subjects to which these articles pertain, as shown in the list. The methods given in these special articles are based upon the principles in the general *METHODS OF TEACHING*.

The last division of the subject includes articles which are of general interest alike to parent and teacher. They do not pertain to any particular method of instruction, but bear a very close relation to all methods; hence they are given in this division. This comprehensive study of *PSYCHOLOGY* and *METHODS OF TEACHING* is so written that any one who has never studied the subjects can read them without difficulty and can easily grasp their meaning.

Psychology



Marvelous as are the mind's achievements, we must note that it is as completely dependent upon the nervous system as is a plant upon sun, rain, and air. Suppose that a child of intelligent parents were ushered into the world without a nerve leading from its otherwise perfect brain to any portion of its body; with no optic nerve to transmit the glorious sensations from the eye, no auditory nerve to conduct the vibrations of the mother's voice, no tactile nerves to convey the touch of the hand, no olfactory nerve to rouse the brain with the delicate aroma from the orchards and the wild flowers in the spring, no gustatory, thermal, or muscular nerves. . . . No matter how perfect might be the child's brain and his inherited capacity for mental activities, his faculties would remain for his life shrouded in Egyptian darkness. Perception could give memory nothing to retain and thought could not weave her matchless fabrics without materials.

—Halleck's *Psychology and Psychic Culture*.

PEDAGOGY.	Related Sciences.	Physical.	Biology.		
			Physiology.		
			Logic.		
		Intellectual.	Mathematics.		
			Natural sciences.		
			History.		
		Moral.	Literature.		
			Ethics.		
			Relation to religion.		
	Educational Movements. (History of Education).	Oriental Nations.	Importance of education.		
			Parseeism.		
			Education among the common people.		
		Ancient Classic Nations.	Education of women.		
			Israelites.		
			Development of the individual.		
		Christian Era in Europe.	Greece.	Sparta.	
				Athenians.	
			Rome.		
		United States.	Early Period.		
			Reformation.		
			Colonial period.		
		Successive Methods.	Humanists.	National period.	Land Grants.
					Free Schools.
				State Universities.	
Realists.			Bureau of Education.		
	The Early Christian Fathers.				
	Schoolman.		Monastic.		
The New Education.			Knightly.		
			Secular.		
	Contrast with Humanists.				
Reformers.	Noted Educational Reformers.				
	Principles of Comenius (see extensive treatment).				
	Beginning.				
Principles and Phases.	Characteristics.				
		Locke.			
		Rosseau.			
Bibliography.		Pestalozzi.			
		Child Study.			
		Subject Matter of Education.			
	Coördinative and Correlative.				
	Method of Teaching.				

QUESTIONS.—PSYCHOLOGY.

Which phase of mental activity, knowing or feeling, is first in consciousness?
 What is the most difficult stage of thinking? What can you say of its development? What are the two general methods of reasoning?
 What is the first act of the imagination in constructing the image?
 Distinguish between memory and imagination.

What power of the mind would be exercised in thinking of the human head joined to the body of a horse?

Fairy tales belong to what phase of imagination?

Why are they adapted to the child mind?

During what period in life are most of our habits formed? Why?

In what way does interest differ from desire?

What is the relation of psychology to physiology?

What are the processes of obtaining an idea?

Explain how an action becomes a habit both from the mental and bodily standpoint.

For how long does the development of the brain continue? After that age knowledge is modified and attained through what means?

Compare the child's process of obtaining knowledge with that of mature minds.

What powers of mind are cultivated in the moral education? The mental? The physical?

What three steps are necessary in thought? Explain them.

What do we mean by the term logic? Logical mind?

What are some of the actions in life taken care of through habit?

Give processes of acquiring habit.

If it were not for habit how would the higher powers of the mind suffer?

Would there be any development? Why not?

Why is it difficult for people to change their views or channels of work in middle life or old age? Of what great benefit is this to the progress of the world?

Through what channels is the mind aroused?

How is perception related to sensation?

Are ideas obtained through sight and touch to be depended upon?

Which ones of the senses are the most reliable and generally more accurately trained?

How can perception be trained?

What is the difference between conception and perception?

What is the chief thing accomplished by thought?

What stage of thought is judgment? What is its particular work?

Reason is what stage in thought? What is its work?

Why are subjects that appeal to observation and thought power valuable for memory training?

What depends in later life upon formation of correct concepts in early training?

Define interest; imagination; attention; apperception.

Where is the force of habit stronger, in the physical or intellectual powers? At what times is habit a protection from a physical standpoint? The intellectual standpoint? The moral standpoint?

Correlated Subjects:

Apperception.

Concept.

Association of Ideas.

Education.

Pedagogics.

Judgment.

Syllogism.

History of Education.

Logic.

Child Study.

Fatigue.

Correlation.

Sensation.

Interest.

Habit.

Reason.

Methods of Teaching.

Philosophy.

PEDAGOGY.—QUESTIONS.

CHILD STUDY.—General.

What is included in child study? What is the aim? How can both teacher and parent assist in this?

By what is a child's ability limited?

Why should a teacher have knowledge of the physical condition of the child? Is this often ignored? With what results?

Why should a teacher be familiar with a child's environment at home? How does this affect her treatment of the individual child?

What effect does the mind have upon the body? The body upon the mind?

How has the subject of discipline changed? With what results?

What beneficial results have followed in the wake of kindergartens, normal schools, individual work by teacher, etc., in home, schools, community and to the child?

METHODS.—General.

What is meant by the term "method?" Upon what should it be based?

What is a "device?" Its general use? Is it ever harmful? When?

Why is application, or use, the true test of all knowledge?

What in general should be the aim of a teacher in her methods?

What is the great end and aim of education?

Which is the more important, principles or facts?

SENSES.

In what order are the senses developed?

What sense gives us the widest range of knowledge? What is the next in importance?

At what period of growth are the senses very keen?

Should any of the senses be trained to the neglect of the others? Is this often done in the schoolroom and home? What are the results?

Upon what powers of mind is the acquiring of knowledge based in the primary grades?

ATTENTION.

How does fatigue affect the mind?

Distinguish between voluntary and involuntary attention.

In presenting a subject what are the processes in securing the attention of the child?

Why should a lesson be conducted from the known to the unknown?

Upon what does attention depend?

Why is it easier to secure the child's attention in the early hours of the morning?

Why are recitations so often dull? What is lacking?

Why is it that many people make a failure of life in a certain sense? Where and how could this have been remedied?

What are some of the methods of training the attention?

What is the importance of attention in the development of the mind?

What are some of the methods of awakening the interest of the pupil?

Distinguish between interest and desire.

Why is it easier to interest the child than the adult?

What should govern the length of a recitation?

What are some of the ways of stunting mental growth?

How does interest in the subject affect the memory?

How can a child be taught to observe carefully and correctly? What is the importance of this? What powers of mind depend upon correct observa-

tion? At what time in life is observation the most important source of information?

MEMORY.

Upon what does memory depend? When is it especially active?

What are some of the devices a teacher may use to strengthen memory?

Is it possible to have knowledge without memory?

Is a child supposed to memorize what he does not understand? If so, how far is it practical to do this and with what end in view?

Why is memory of so much importance? Is it really a part of every other power of the mind?

What studies are especially valuable for training the memory?

How is memory affected by repetition?

How does interest in the subject affect the memory? What is the importance of interest in class recitals from this standpoint?

IMAGINATION (see Questions).

HABIT.

To what does a repetition of an act finally lead?

In what ways does habit affect the physical, intellectual and moral nature?

What do we mean by a plastic condition of the mind or nervous system?

Why are habits formed more easily in early youth? After what age are important habits seldom formed?

In what ways can a teacher assist in the formation of good habits?

How does habit determine character?

REASON.

At what age is a child supposed to begin to reason? Up to this time what has taken its place?

What is the importance of judgment in reasoning and upon what does it primarily depend?

In what grade of school work is the inductive method of reasoning best adapted? When and to what does this change?

What is the deductive method of reasoning and what department of school work is it best adapted to?

WILL.

What is instinct? What finally results from it?

What is the difference between an impulse and a desire? In which is the will brought into action?

What is meant by deliberation? To what action does it lead? What is the difference between a mature will and that of a child?

Why does choice involve so many difficulties?

Is will the means of preventing action as well as performing it? Give examples of both states of mind.

How may the will be cultivated? What factor is it in the formation of habits?

Upon what is stubbornness based? Is it an action of the will?

Will exercises what control over the feelings? Does its control extend at last to all mental powers? With what effect?

Why is will the highest of mental powers?

IMAGINATION.

Of what practical use is imagination? Upon what is worry based? Cheerfulness?

Difficult experiences in arithmetic, grammar and other studies are due to what?

Which is the broader term, memory or imagination?

Physics

I. MATTER.

1. Definition.
2. Kinds.
 - a. Solids.
 - Properties.
 - Adhesion.
 - Cohesion.
 - Ductility.
 - Elasticity.
 - Density.
 - Porosity.
 - Malleability.
 - Tenacity.
 - Hardness.
 - b. Liquids.
 - Definition.
 - Hydrostatics—rest.
 - Hydraulics—motion.
 - Application of laws.
 - c. Gases.
 - Air.
 - Vapor.
 - Steam.
 - Atmosphere.
 - Properties.
 - Application of laws.

II. MECHANICS OR DYNAMICS.

1. Statics.
2. Kinetics.
 - a. Mechanical powers.
 - Lever.
 - Pulley.
 - Screw.
 - Wedge.
 - Wheel and axle.
 - Inclined plane.
 - b. Force.
 - Energy.
 - Composition of forces.

- Gravitation.
 - Falling bodies.
 - Specific gravity.
- Center of gravity.
- Pendulum.
- Momentum.
- Parallelogram of forces.
- Pneumatics.
- Rotation.
- Velocity.
- Strength of materials.
- Expansion.
- Extension.
- Capillarity.
- c. Units of measurement (see Unit).
 - Dyne.
 - Foot pound.
 - Horse power.
 - Poundal.

III. SOUND.

1. Production.
2. Propagation.
 - a. Waves.
 - b. Echo.
 - c. Reflection.

IV. HEAT.

1. Definition.
2. Theories.
3. Sources.
 - a. Sun.
 - b. Friction.
 - c. Chemical action.
4. Temperature.
5. Radiation.
6. Boiling.
7. Freezing.
8. Specific heat.
9. Energy.
10. Laws and applications.

V. LIGHT.

1. Sources
 - a. Sun.
 - b. Chemical action.
 - c. Mechanical action.
2. Reflection.
3. Refraction.
4. Regelation.
5. Defraction.
6. Diffusion.
7. Polarization.
8. Aberration.
9. Actinism.
10. Focus.
11. Lens.
12. Color.
13. Spectrum analysis.
14. Rainbow.
15. Photometry.
16. Mirror.
17. Fluoroscope.
18. Mirage.
19. Aurora borealis.
20. N-rays.
21. Cathode rays.
22. Roentgen rays.
23. Lightning.
24. Optical instruments.

VI. ELECTRICITY.

1. Definition and theories.
 - a. What is electricity?
 - b. How produced?
2. Kinds.
 - a. Static or frictional.
 - b. Voltaic.
 - c. Positive.
 - d. Negative.
3. Laws and applications.
 - a. How does electricity travel?
 - b. Motive power, etc.
 - c. Electric light.
 - d. Electric heating.
4. Uses in medicine.

VII. MAGNETISM.

1. Theories.
2. Properties.
3. Kinds.
 - a. Natural.
 - b. Artificial.
 - c. Electro-magnetism.

4. Magnet.
5. Magnetic needle.
6. Laws and applications.

VIII. PHYSICAL INSTRUMENTS.

1. Accumulator.
2. Aerostatic press.
3. Air compressor.
4. Air pump.
5. Archimedeian screw.
6. Arc light.
7. Argand lamp.
8. Armature.
9. Barker's mill.
10. Barometer.
11. Blowpipe.
12. Crookes' tubes.
13. Camera lucida.
14. Camera obscura.
15. Electric battery.
16. Electric generator.
17. Electric machine.
18. Dynamo.
19. Electric meter.
20. Electric motor.
21. Electrode.
22. Electrophorus.
23. Electroscope.
24. Geissler tubes.
25. Induction coil.
26. Insulator.
27. Leyden jar.
28. Object glass.
29. Siphon.
30. Spectroscope.
31. Storage battery.
32. Voltmeter.

X. MISCELLANEOUS.

1. Avogadro's law.
2. Boyle's law.
3. Demonstration.
4. Ether.
5. Fata Morgana.
6. Ice.
7. Liquid air.
8. Spheroidal state.
9. Vacuum.
10. Chemistry.
11. Armature.
12. Hydrometer.

QUESTIONS—PHYSICS.

- What makes it so difficult to walk on ice?
Where is it desirous to do away absolutely with friction? What means are used to do this?
What forces are overcome in withdrawing a nail?
Give a short explanation of what would result if friction did not exist.
Give practical examples of cohesion and adhesion.
Which learns to walk more easily, the biped or quadruped? Why?
What is meant by the term "cold"?
What do you understand is temperature?
Why do you rub your hands together when cold?
Why does fire produce heat?
What do we mean by a conductor of heat? By what method is a poker heated? Flatiron?
Why are iron tools fitted with wooden handles?
When you touch ice, is it giving off cold or your hand giving up heat?
Does a fur coat produce heat? Why is it warm?
Why do you wear woolen garments in winter?
You stand at a heating stove to get warm; explain why.
How is heat imparted to a teakettle of water?
How does the sun heat the earth?
How is the expansion of heat used in practical ways? What are the uses of steam?
Why are feathers a warm covering for birds?
Why do men wear woollens in attending to furnaces?
What is the principle of the double window in winter?
When both are in the same temperature, which is colder, marble or wood?
How long does an object feel cold?
Why do we poke a fire to make it burn better?
What do we mean by "soft water"?
What is the cause of twilight?
Why do the stars seem to twinkle?
What is sound? Why can we be heard a greater distance by speaking through tubes?
Of what metal are lightning rods usually made?
Why is it dangerous to sit near a chimney during an electrical storm?
What substances are good conductors of electricity? Poor?
What is the distance of the sun from the earth? At what rate does light travel?
Some miles from the earth total darkness reigns. Explain light upon the earth.
Why does more rain fall by night than by day?
Why are clear nights usually cold?
Why does little dew form at the base of hedges and around the roots of trees?
Why is a running jump longer than a standing one?
What causes the formation of a rainbow?
What is a mirage? What produces the echo?
Ten inches of snow is equal to how many inches of rain?
What causes dew? Frost? Fog? What enables you to see your breath on a cold day?

Heat

- I. THEORY AND DEFINITION.
 - II. SOURCES.
 - 1. Natural.
 - a. Sun.
 - 2. Artificial.
 - a. Friction.
 - b. Chemical action-electricity, etc.
 - III. MEANS OF TRAVEL.
 - 1. Conduction.
 - 2. Convection.
 - 3. Radiation.
 - IV. PROPERTIES.
 - 1. Expansion.
 - a. Changes solids to liquids.
 - 2. Produces light.
 - V. PRACTICAL APPLICATION OF LAWS OF HEAT.
- Correlated subjects: Röntgen Rays, Electrolysis, Dynamo, Electric Light, Hydrometer, Falling Bodies, Expansion, Ether, Water Wheels, Electro Magnet, Theory of Light, Dyne, Poundal, etc.

QUESTIONS—HEAT.

- What happens if a hot iron is placed on a cold one?
- Can a body be cold and yet have heat?
- What is heat?
- Where does it come from?
- Do the stars give off heat?
- What causes fire?
- How are our bodies heated?
- How does heat travel?
- What is the meaning of conduction?
- What happens to the size of a body when heated?
- Why are wagon tires made a little smaller than the rim of the wheel?
- Give examples in expansion.
- What happens to camphor when heated to a high temperature?
- How does heat produce light? What body gives us both heat and light?
- How do fur garments keep us warm?

QUESTIONS—LIGHTNING.

- What causes lightning?
- Is there lightning in cold weather? Why not?
- When does lightning strike the earth?
- What causes a thunderbolt?
- Does the echo play any part in the loud peals of thunder heard?
- Who invented the lightning rod?

QUESTIONS—ILLUMINATING GAS.

- Who first used illuminating gas successfully?
- When was it first introduced into England?
- How is illuminating gas made?
- What is coal gas? How made?
- Where was the first coal gas obtained?
- In making gas out of coal, what becomes of the tar and ammonia?
- What is the condenser?
- What is the use of a meter?
- How is water gas made?
- Which is the cheaper?
- How does oil gas differ from water gas?

QUESTIONS—ICE.

When does water freeze?
When water freezes, how much does it increase its bulk?
Which is the heavier, ice or water?
Why does a pitcher break when water freezes in it?
Where is natural ice obtained?
What is the first step in harvesting ice?
How is the cutting done?
From what material are the ice houses made?
What is the ice packed in?
Where is the most expensive ice harvesting?
How is ice manufactured?
How is the marking done in harvesting the ice?
How is the ice hauled to icehouse?

QUESTIONS—LIGHT.

What is light? Where does it come from?
How is it produced?
The union of what two chemicals produces candle, lamp and gas light?
How is electric light produced?
How does light travel?
How fast does it travel? Does it travel faster than sound?
How many minutes does it take light to reach the earth from the sun?
How many years does it take for light to reach the earth from certain stars?
Why?
What is the substance called that permits light to pass through it? Name five.
What is the substance called that does not permit light to pass through it? Name five.
What substances permit part light to pass through? Name three.
What is refraction?

The truest owner of a library is he who has bought each book for the love he bears it.
In education the process of self-development should be encouraged to the fullest extent.
Children should be told as little as possible and induced to discover as much as possible.
—Patrick.

When I get a little money I buy books; and
if any is left, I buy food and clothes.*

—*Erasmus.*

Physiology

The study of **PHYSIOLOGY** is very interesting, but its value to the average student is in the fact that it acquaints him with knowledge that ministers to his well being.

This knowledge is originally gained by observation, experiment and by studying the conditions of diseases. While the information is of value from an educational standpoint, the care of the body, the prevention of diseases and the development of powers resulting in a better physique and longer life are the direct results of this study. Every home and school should be the center of such investigation.

It is impossible to carry on this study successfully without some sort of a guide. The suggestive outlines and questions here presented, with the practical treatment of these interesting subjects in **THE NEW PRACTICAL REFERENCE LIBRARY**, all presented in simple language by editors representing the latest research, opens up a field of study that should be utilized in every home and school.

For the guidance of the student we furnish herewith a general outline covering the subject as a whole. In addition we give you an outline covering the system of **CIRCULATION** and one of the subdivisions of the senses.

These outlines are simply developed from the material supplied in **THE NEW PRACTICAL REFERENCE LIBRARY** under the various headings related to same, and if the student will but make a complete outline covering the entire subject in accordance with the suggestions here submitted he will not only have an exhaustive study for future reference but the education it affords will be a source of untold pleasure and profit.

Human Body

Origin. Cell.	Tissues. Composition.	Organs. Health.
I. BONES.	II. MUSCLES.	
Number.	Number.	
Structure.	Structure.	
Kinds.	Kinds.	
Growth.	Parts.	
Divisions.	Contraction.	
Articulation.	Use.	
Uses.	Wonders.	
Hygiene.	Hygiene.	
Disease.	Disease.	

III. DIGESTION.

Organs.
Secretion.
Food.
Processes.
Wonders.
Hygiene.
Disease.

IV. CIRCULATION.

(See extensive outline.)

V. RESPIRATION.

Organs.
Movements.
Frequency.
Air.
Uses.
Modifications.

Hygiene.

Diseases.

VI. NERVOUS SYSTEM.

Definition.

Organs.

Uses.

Special Sense.

Feeling.

Taste.

Smell.

Sight.

Hearing.

(See exhaustive outline on
Ear.)

Hygiene.

Diseases.

QUESTIONS—PHYSIOLOGY.

How many bones are there in the human body?

In what way is a combination of strength and elasticity secured for the spinal column?

How many bones in the head? Why is it so carefully protected?

What is the bone formation of the wrist?

Describe motion of shoulder blade.

Between what ages does the condition of bone reach perfection?

Are teeth a part of the skeleton or of the skin structure?

What is the difference between the joint at the upper end of the ulna and the humerus? Can you detect a reason?

Of what is the hip bone, or tibia, at its upper extremity a good example as to joint? Give reason.

Can you give any reason for the fibula bone?

What is the science of Osteopathy?

Why are the bones of the aged more liable to break than in youth?

What is the function of the muscular system? What surrounds the muscles and for what reason?

What is the function of the muscular system?

What is necessary for muscular action?

Of what in general does the circulatory system consist?

What is the function of the lungs? What does oxygen do for the blood?

What aid do plants render to the blood?

Give the process by which the blood gives up its nourishment and carries away waste.

In what respect do the veins differ from the arteries?

What are capillaries? What is the function of the lymphatic glands?

What are the two great nerve systems? In general, what is the function of each?

In a case of indigestion, to which nervous system will the message be sent?

By what means has our knowledge of physiology been attained?

How does the human brain compare in size and weight with that of other animals? Who is said to have had the largest brain?

What is the most important characteristic of the blood?

How does the human brain compare in size and weight with that of other animals?

How does the weight of the cerebellum compare with that of the cerebrum?

What are the two great series of changes continually going on in the body?

In general what are the functions of the human body?

Describe the work of the salivary glands.

Give in general the function of the spinal cord.

How does the nervous system in some measure control the heart?

What is the chief use of fat?

By what device is the blood brought in contact with the air?

What are the relative positions of liver and stomach?

Is idiocy in any way dependent upon the size of the brain?

What are the organs of special sense?

What special protection is provided for the heart?

Would you expect the mitral valves to lift up or down?

Look up different articles on the subject and explain how bones are renewed.

Give the effect of iron upon the blood.

Explain the action of blood in case of a wound.

What is the function of the kidneys.

Why has blood a salty taste?

Could a person bleed to death from a small wound?

In case of general debility, in what condition would you find the blood?

The sensation of sight is carried by what nerve?

Do you think it possible to hear after the outer ear has been injured? If so, by what method?

Why is the aorta important?

What do you know of William Harvey?

Is there any difference between germs and bacteria?

Explain the term, "Germ Theory of Disease." How would you regard the spittle of a consumptive in reference to this theory?

What is the cause of tuberculosis of the kidneys, bowels, bones, etc.?

By what means is the waste material thrown off from the body?

Why are thin garments worn in summer?

What do you mean by the term "Out of breath"?

What are the causes of appendicitis? Is this disease connected with bacteria in any way? What is the particular danger in the disease?

In what part of the world does cholera occur? Why?

Explain the difference between allopathy, osteopathy and homeopathy.

To what end is the stethoscope used by the physician?

What are the causes leading to apoplexy?

Explain the growth of the hair, finger nails, etc.

In general trace the blood from the time it leaves the left ventricle until it returns to it.

How does the weight of the blood compare with that of the body?

Explain how blood is propelled through the body.

What are some of the causes of indigestion?

Why is mastication of food so important?

What is meant by a vital organ? Name and locate them.

What do we mean by "Chronic Diseases"? Name a few and the causes of same.

What is the function of tears?

In what manner is the skull constructed in order to protect the brain?

In case of cutting the thigh in front, where would you bind the wound, above or below?

What ultimately becomes of all fat taken into the body?

If receiving a wound, how can one tell whether the bleeding results from an injury to a vein or artery?

What are the causes of cancer?

Circulation

- | | |
|--|---|
| <ul style="list-style-type: none">I. ORGANS.<ul style="list-style-type: none">1. Heart.2. Arteries.3. Capillaries.4. Veins.II. PARTS.<ul style="list-style-type: none">1. Pulmonic.2. Systemic.III. BLOOD.<ul style="list-style-type: none">1. Definition.2. Amount.3. Temperature.4. Kinds.5. Composition.6. Coagulation.IV. OSMOSIS—INTERCHANGE OF BLOOD ELEMENTS.V. CAUSES OF—<ul style="list-style-type: none">1. Force of heat.2. Elasticity of arterial walls.3. Muscular action.4. Suction from veins.5. Suction in inspiration. | <ul style="list-style-type: none">VI. FUNCTIONS.<ul style="list-style-type: none">1. Nourish.2. Purify.3. Warm.4. Trace the blood.VII. HYGIENE.<ul style="list-style-type: none">1. Accident.2. Effect of exercise.3. Effect of air and sunlight.4. Effect of chill.5. Effect of pressure.VIII. DISEASES.<ul style="list-style-type: none">1. Congestions.2. Inflammation.3. Scrofula.4. Cold.5. Catarrh.IX. RELATED PROCESSES.<ul style="list-style-type: none">1. Absorption.2. Assimilation.3. Secretion.4. Excretions. |
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ORGANS OF CIRCULATION.

- | | |
|---|---|
| <ul style="list-style-type: none">I. HEART.<ul style="list-style-type: none">1. Definition.2. Shape.3. Size.4. Situation.5. Relation to surrounding parts.6. Weight.7. Proportion to body's weight.8. Structure.9. Parts.10. Openings.11. Valves.12. Nerve supply.13. Movement.14. The heart's work. | <ul style="list-style-type: none">II. ARTERIES.<ul style="list-style-type: none">1. Definition.2. Coats.3. Circulation in arteries.4. Pulse.5. Anastomosing.III. CAPILLARIES.<ul style="list-style-type: none">1. Definition.2. Coats.3. Diameter.4. Circulation in capillaries.5. Office.IV. VEINS.<ul style="list-style-type: none">1. Definition.2. Coats.3. Valves.4. Circulation in veins.5. Compared with arteries and capillaries. |
|---|---|

QUESTIONS.

What is circulation? Name the organs of circulation.

Describe the heart. Define arteries; veins.

Describe the circulation of the blood. Of what is blood composed?

What are the uses of the blood? What is the normal temperature of the blood?

What is the color of the blood in the veins? In the arteries? What causes the change?

Describe coagulation. What are the parts coagulated? What is the serum?

Give the functions of the red corpuscles.

What are the commercial uses of the blood?

Who were the first people who used the blood from butchered animals in making blood cake and blood sausage?

Fertilizers manufactured from blood sell at what price per ton?

Blood is used in the manufacture of what very important article of diet?

In what way is blood used in the manufacture of buttons? Imitation tortoise shell?

For what manufacturing purpose do the Japanese use blood extensively? For what do physicians frequently prescribe blood? Where can a supply be obtained?

Was the circulation of the blood known at the time of the discovery of America?

Who first examined the circulation of blood in the web of a frog's foot? When?

Distinguish between the pulmonic and systemic circulation.

What vein carries the blood to the liver? What is the function of the hepatic veins?

How long does it take the blood to make a complete circuit of the system?

How long does it take the whole amount of blood to pass through the heart?

What part of the weight of the body is the blood?

The skeleton of an adult is said to weigh 14 pounds. Does the blood weigh more or less?

A person of average weight (154 pounds) is said to have approximately 100 pounds water, 60 pounds muscle, 14 pounds bone, 12 pounds blood and 4 pounds brains. How do you reconcile these figures?

What four forces propel the blood?

What is the arch of the aorta? Does the aorta pass through the diaphragm?

Name the divisions of the aorta which supply the pelvis and lower extremities.

What is the name of the minute endings of the arteries connecting them with the veins?

Why is the inner coat of the arteries smooth?

Which coat of the arteries assists in propelling the blood? How?

When does an artery become a capillary?

What do you understand by the term "Anastomosis"? Explain its function.

How may one check the flow of an artery when severed?

Where are the capillaries the largest? Where are the smallest capillaries? How can you illustrate their size?

How does the heart of a reptile differ from other animals?

How is the heart suspended in the chest? With what is the heart surrounded?

Ear

Definition.

Situation.

Acoustic contrivances.

Parts.

I. EXTERNAL.

1. Convoluted portion.
Adaptability.
Helix.
2. Auditory canal.
Length.

II. TYMPANUM.

1. Definition.
2. Situation.
3. Size.
4. Cavity.
5. Opening.
6. Filled with.
7. Ossicles.
Number.
Names.
Arrangement.
Action.
Function.
8. Eustachian Tube.
Definition.
Length.
Function.
Connects what?
9. Tympanic membrane.
Definition.
Position.
Action.
Function.

10. Mastoid cells.

Opening.

Abscesses; how caused?

Function.

III. LABYRINTH.

1. Comparative anatomy.
2. Situation.
3. Bony labyrinth.
4. Membranous labyrinth.
5. Fluid.
6. Vestibule.
Opening into tympanum.
Opening for auditory nerves.
Opening for cochlea.
Five openings into semi-circular canal.
Otoliths.
Fluid.
7. Semi-circular canals.
Number.
Names.
Positions.
Function.
8. Cochlea.
Resemblance.
Definition.
Columella.
Organ of Corti.
Divisions.
Partitions.

QUESTIONS.

What is the ear? What is the outer ear? What separates the outer from the middle ear?

What are the three bones of the middle ear?

What is the Eustachian tube? What is its function?

What are the parts of the inner ear? What are the organs of Corti?

Trace the transmission of sound from the outer ear to the brain.

Name bones of middle ear and describe their action.

What is the comparative size of the ear and its capacity of receiving sound in the lower animals?

Give three proofs showing the delicate sense of hearing in birds.

What animals are very dull in this sense?

In what animals is the hearing located in the legs? Is this also true of most insects?

How does the beetle hold its antennules in order to detect sound?

What animals have the keenest sense of hearing?

Is it possible for some animals to hear sounds which are pitched too high for the compass of the human ear?

Give three ways for influencing the propagation of sound to the tympanum.

What are the names of the nerves of hearing?

How are sound waves attracted to the auditory canal?

What is the eardrum? To what is it attached? How is its inner surface lined?

How does air enter the middle ear?

What is the eustachian tube?

Why are the bones of the middle ear called hammer, anvil and stirrup?

How are the vibrations of the eardrum transferred to the internal ear?

Where is the internal ear located?

How are the semicircular canals connected with the vestibule?

Why is the cochlea or snail shell so called?

Of what use is the fluid in the internal ear?

How are the sound vibrations which enter the ear reproduced?

How do the bones of the middle ear affect the vibrations?

What parts of the inner ear operate the same as do the strings of a piano?

What regulates the tension of the eardrum?

How are we enabled to recognize a multitude of sounds?

The thought we need, the facts we are in search of, may make their appearance in the corner of the newspaper, or in some forgotten volume long ago consigned to dust and oblivion.

—Charles F. Richardson.

Books, schools and education are the scaffolding by means of which God builds up the human soul.
—Humboldt.

Religion

In THE NEW PRACTICAL REFERENCE LIBRARY we not only give you a long article on the Bible, but we also treat the separate books of the Bible under their separate titles, or under names of famous characters associated with them.

Much information will be found on the subjects of the religious history and the religious thought of the world.

This LIBRARY is designed to be a useful, convenient companion in the study and the proper understanding of the scriptures, since it brings in alphabetical order the chief names, persons, things and events referred to in the Bible and gathers into condensed form much, not only from the Bible, but through outside sources.

We also treat the various religions embracing their history, doctrines and successes.

OUTLINE.

- I. POLYTHEISTIC RELIGION.
 - 1. Brahmanism.
 - 2. Buddhism.
 - 3. Confucianism.
 - 4. Shintoism.
- II. MONOTHEISTIC RELIGION.
 - 1. Judaism.
 - a. High priest
 - b. Rabbi.
 - c. Sanhedrin
 - d. Passover.
 - e. Talmud.
 - 2. Roman Catholic.
 - a. Distinctive features.
 - 3. Protestantism.
 - a. Distinctive features.
 - 4. Mohammedanism.
 - a. Distinctive features.
- III. SACRED BOOKS AND WRITINGS.
 - 1. Bible.
 - a. Books—Authors.
 - b. Noted characters.
 - c. Apocrypha, etc.
 - 2. Koran.
 - a. Mohammedanism.
 - 3. Vedas.
 - a. Brahmanism.
 - 4. Talmud.
 - a. Judaism.
- IV. SECTS AND SOCIETIES.
 - 1. Ancient.
 - a. Anabaptists.
 - b.
 - c.
 - 2. Modern.
 - a. Y. M. C. A.
 - b. Sisters of Charity.
 - c. W. C. T. U.
 - d. Good Templars.
 - e. Red Cross.
 - f. Capuchins.
- V. BIBLICAL CHARACTERS AND PLACES.
 - 1. Jerusalem.
 - 2. Moses.
 - 3. Palestine.
 - 4. Solomon.
 - 5. David.
 - 6. Jesus.
 - 7. Rome, etc.
- VI. MISCELLANEOUS.
 - 1. Doctrines and ceremonials.
 - a. Atonement.
 - b. Baptism.
 - c. Celibacy.

d. Predestination.		c. Missions and missionaries.
e. Transmigration of souls.		3. Miscellaneous terms.
2. Institutions.		a. Pope; patriarch; nirvana, etc.
a. Apostolic succession.		
b. Church.		
CORRELATED SUBJECTS.		
Byzantine art	Milton	Nazarene
Burnt offering	Priest	Christmas
Easter	Prophets	Moravian Brethren
Religious liberty	Huguenots	Pope
Talmud	Free Church of Scotland.	Positive philosophy
Shakers	Monastery	Creed
Jesus Christ	Miracle	God
Jerusalem		Synagogue
Monotheism		

QUESTIONS—RELIGION.

What is religion in its broadest sense?

Give proof that it is common to all races of mankind.

What do we mean by "world religions"? What is the prominent characteristic of them as a whole? Name them. Who was the originator of each?

What is a monotheistic religion? Name those existing today.

Locate and give characteristics of believers in Mohammedanism, Buddhism, Confucianism, Christianity. Number of followers of each?

Was the state and church one in former times? What has caused their separation?

What do we mean by religious liberty? Compare the condition today with that of ancient times.

At what time and in what nation did religious toleration originate?

What is Christianity? What factor has it been in the history and progress of the world?

Is a nation's growth in any way dependent upon its form of religion? What of the Grecian and Roman civilization in this regard? Why was it not enduring?

What are some of the forms of religion in savage tribes?

Can mythology be regarded as a form of religion?

What influence has the United States exerted on the world in regard to religious toleration?

Upon what principle were many of the Colonies established in America?

MORMONS.

By whom was the Mormon Church formed?

At what age did he claim that the first two persons of the Trinity had visited him?

When were the plates of the Book of Mormon delivered to him? Describe them. In what language were they written? When and by whom translated?

After translation to whom is it claimed the plates were delivered?

Were missionaries sent abroad in the interests of the faith?

How many thousands were converted and baptized in England in two months?

Was much opposition encountered during the early years?

When did the Mormons remove to Utah?

When was polygamy prohibited by act of Congress?

What is the membership now?

Transportation

One of the most important factors in the rapid growth of nations along commercial lines during the last fifty years is that of up-to-date methods of TRANSPORTATION. The extensive internal commerce of the United States is a surprising feature of this growth due to the vast systems of railroad lines permeating every section, from Atlantic to Pacific, from Canada to Gulf. Not of the United States alone is this true, but the phenomenal growth extends to all parts of the world, bringing into close touch all the nations of the earth. The handling and manipulation of the world's vast products has also been helped by legislation in different countries. The subject of FREIGHT is discussed in a very thorough and up-to-date manner in THE NEW PRACTICAL REFERENCE LIBRARY, together with the legal phases of the subject under heads of HIGHWAYS, INTERSTATE COMMERCE ACT, COMMON CARRIER, MUNICIPAL OWNERSHIP, etc.

The great question of reducing the time, inconvenience, and annoyances to which the traveling public is subject is amply discussed under the heads of RAILROADS, ELECTRIC RAILWAYS, STREET RAILWAYS, SHIP, etc. The subject especially interesting at present, AERIAL NAVIGATION, is treated under general head of FLYING MACHINE. The timely and interesting subject of AUTOMOBILES is also fully discussed.

Some of the greatest engineering feats of the world have been necessary in opening up new territory or improving lines of travel, but in either case it has been accomplished, and the methods and results are fully discussed under titles above mentioned in our NEW PRACTICAL REFERENCE LIBRARY.

Railroads

I. HISTORY.

1. Early history.
2. Development.
3. Leading countries.
4. Approximate mileage.
5. Great railroads (which see).
 - a. Cape to Cairo.
 - b. Trans-Siberian.

II. CONSTRUCTION.

1. Location—how determined?
2. Surveys.
3. Roadbed.
 - a. Width for single track.
 - b. Width for double track.

c. Grading.

- d. Ties.
- e. Rails.
- f. Ballasting.

III. EQUIPMENT.

1. Rolling stock.
2. Station.
3. Depot.
4. Shops.
5. Yards.
6. Water supply.
7. Signals.
8. Telegraph and telegraph lines.

IV. ORGANIZATION.

1. Stockholders.
2. Directors.
3. Officers.

V. SIGNALING.

1. Block system.
2. Telegraph.
3. Automatic.

4. Banjo signal.

5. Semaphore.

6. Banner.

VI. CONSOLIDATION.

1. Object.
2. Advantages.
3. Results.
4. Recent legislation.

Early History *

I. ROME.

Track consisted of two lines of dressed stone.

II. ENGLAND.

First approach at modern style.

1602—Wooden rails—Tramway.

Later flat strips of iron added.

1767—Cast iron rails introduced.

1769—Upright flange added to rail.

1829—First modern railroad—Liverpool & Manchester.

Steam as motive power successfully introduced.

III. UNITED STATES.

1826—First horse power—Quincy, Massachusetts, to coast.

Use—To carry stone for Bunker Hill Monument.

1829—Delaware & Hudson Canal Company.

Length—Sixteen miles.

Horsepower and stationary engine at first.

Use—Carry coal, Carbondale to Honesdale, Pa.

First locomotive, Stourbridge Lion, imported from England.

1830—Baltimore & Ohio opened for traffic.

First road for passengers and freight.

QUESTIONS.

What railroads pass through your city? Your county? What are their terminal points?

Give five ways in which they are an aid to you.

When and where was steam introduced as a motive power in railway affairs?

What is the usual length of a rail? Its weight? Its height? What is the length of ties? Their thickness? How far apart are they placed?

When and upon what road were dining-cars first used?

Describe a modern first-class passenger train and tell of what it consists.

Explain railway signaling. The block system.

How does the mileage of the Vanderbilt system compare with all the railroads of Canada? Of Italy? Brazil? Mexico?

How does the length of the Trans-Siberian Railway compare with the distance from London to New York? From New York to San Francisco?

What creates a demand for railroads? Why are they the natural pioneers in opening up new territory? What are their methods along this line?

What are known as the pioneer railways? Where located?

What enterprises follow in the wake of railroads?

*From the general outline we expand the first sub-topic, "Early History": in like manner have the pupil develop the several divisions of this very interesting and timely subject.

What can you say of the manufacture of American locomotives? Are they in demand abroad?

What is the largest locomotive works in the United States?

What were the direct results of the Interstate Commerce Act? When was it passed? What late movement has taken place along this line, and why was it necessary?

What danger to the public lies in sharp competition of railway lines?

When did Pullman make his first sleeping-car? Where first used? How are the Pullmans used in connection with railway lines?

What system is followed in the transportation of freight?

What state of affairs seems to call for a consolidation of the railroads? What good results? What evil?

What is the system of brakes now in use on passenger trains?

What is the average weight of a passenger locomotive? Its size? Its cost? Of a freight locomotive?

What is the size and cost of a standard sleeper? Of a tourist sleeper?

The United States has what percentage of the railway mileage of the world? How does it compare with that of Germany and England?

What country has approximately one-half of the railroad mileage of the world? Which has the greater mileage, Great Britain or Germany?

How many miles of railroad were built in the United States between 1830 and 1831? How did this compare with the world?

What is said regarding railroad construction in the United States from 1835 to the beginning of the Civil War?

In what year was the New York Central completed to Albany?

If there are 500 oak trees to the acre of timber and each will yield ten railroad ties, how many acres of timber necessary to furnish the ties from your railroad station to your county seat? To your nearest shipping point?

At what time were railroads built with rails made of dressed stone? Of wood? Of tin? Cast iron?

What motive power was used on the first railway built in the United States?

How many miles of railway were there in the country at the beginning of the Civil War?

If all the railroads of the United States were made into a single track, how many thousand miles would it extend beyond the moon? Running forty miles an hour without a stop, how long would it take a train to go from one end of this track to the other? How many times would this single track reach around the earth?

Life of Car Wheels—Statistics gathered from various railroads show that perfect car wheels often roll from three hundred thousand to four hundred and fifty thousand miles before they have to be turned down. Wheels with flaws in them run only about fifty to ninety thousand miles.

Telegraph

I. DEFINITION AND USES.

II. KINDS.

1. Electrical telegraph—Morse system.
2. Submarine cable—Morse system.
3. Wireless—Marconi system.

III. APPARATUS.

IV. DETAILED DESCRIPTION OF WORK.

V. HISTORY.

VI. RESULTS TO WORLD.

Electrical Telegraph

I. DEFINITION.

1. Apparatus.

- a. Battery or source of current.
- b. Transmitter or key.
- c. Line wire to convey current; telegraph poles, etc.
- d. Receiver or sounder.

II. TECHNICAL DESCRIPTION OF WORK.

III. HISTORY.

1. 1837—Exhibition of the Morse plans.
2. 1840—Patent obtained.
3. 1844—First line completed—Washington to Baltimore.
4. System of signals adopted, etc.
5. Extension of work.
 - a. Submarine cable, etc.
 - b. Establishment of system throughout world.
 - c. Inventions extending its usefulness.

IV. STATISTICS OF MILEAGE, ETC.

1. United States.
2. Foreign countries.

V. OTHER SYSTEMS.

1. Bonelli.
2. Wireless.

VI. COMMERCIAL VALUE.

QUESTIONS.

When and by whom was the telegraph invented?

From your own observation what essential parts and instruments are necessary in a telegraph office?

By illustration follow a message sent from Chicago to St. Louis. What does A represent? B?

What is a relay?

Which is more rapid, the telegraph or telephone, for communicating between long distances? Give two reasons for your answer.

What signal honor was given Morse by ten countries?

Give a short account of Prof. Samuel Morse. Along what lines other than electricity was he interested? To whom did he apply for funds with which to establish the first experimental line of telegraph? Where was the first line established?

Who was John W. Mackay? What telegraph companies did he form?

In what way did Alfred Vail assist Morse?

What device invented by Edison has been of great value in telegraphy?

Did Congress at first have faith in the proposition?

What are the two main telegraph companies?

Who is the inventor of the wireless system? Is this being used to any practical extent? Where is its use especially beneficial?

In what ways does the telegraph accelerate business? Is the growth of a nation along commercial lines in any way dependent upon it? How?

In wireless telegraphy the distance of the message depends upon what?

What is the conductor in the Morse system? In the Marconi system?

Which is cheaper, the construction of wireless telegraph stations, or a submarine cable?

What are some of the wireless telegraph stations? How far apart are some of them?

What are the points of resemblance and difference between the Morse and Marconi systems?

Why can the wireless system be used to better advantage on sea than land?
In what department of the army is this system being used largely?

Canals

- | | |
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| <p>I. DEFINITION AND PURPOSE.</p> <ol style="list-style-type: none">1. Navigation.2. Irrigation. <p>II. CONSTRUCTION.</p> <ol style="list-style-type: none">1. Locks.2. Reaches.3. Inclines.4. Dams.5. Lifts.6. Work in general. <p>III. ANCIENT.</p> <ol style="list-style-type: none">1. Egyptian.2. Chinese.3. Romans. <p>IV. MODERN.</p> <ol style="list-style-type: none">1. European.2. American.3. Miscellaneous. <p>V. RELATED SUBJECTS.</p> <ol style="list-style-type: none">1. Docks.2. Waterworks.3. Aqueduct. | <p>VI. IMPORTANT CANALS.</p> <ol style="list-style-type: none">I. Names.<ol style="list-style-type: none">a. Panama.b. Suez.c. Erie.d. Sault Sainte Marie.e. Welland, etc.f. Manchester Ship.g. Kaiser Wilhelm.h. Chicago Drainage.2. Location.3. Construction.<ol style="list-style-type: none">a. Time.b. Cost.c. By whom.4. Effects.<ol style="list-style-type: none">a. commerce.b. International affairs.c. Water routes. |
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QUESTIONS.

Of what value will the completion of the Panama Canal be to the United States? To the world? What effect on commerce? On railways of the United States, and what class of railways?

In how many less days will a ship sail from New York to San Francisco on its completion?

What do we mean by the term "canalized"?

Why is it generally necessary for the government to take charge of the construction of canals?

Name some of the natural obstacles to be overcome in the construction of a canal.

When was the canal lock invented and what important changes did it lead to in the construction of canals?

How does the mileage of canals of the United States compare with that of other countries?

Give examples of canals for navigation and irrigation purposes respectively. Give names of canals designed for both purposes.

At what date was the construction of the Panama Canal undertaken? Under whose direction? What other canal had this engineer already constructed?

What led to the United States gaining control of this undertaking? At what date did the Panama Commission appointed by President Roosevelt begin active operations?

For how many centuries has the question of a canal across this isthmus been agitated? How does it compare as an undertaking with other canals? Why?

What great railroad president at one time secured concessions and took up the work of completing the canal? What did it cost him?

What practical problems does the Suez Canal solve? In what way is Great Britain especially benefited?

How will the completion of the Panama Canal affect Hawaii and the Philippine Islands?

What system of canals connects the Great Lakes and the Atlantic Ocean? What effect does this have on the commerce of the interior of the country?

What is the length of the Erie Canal and how does it compare in this respect with others?

What effect on the state of New York did the construction of this canal have? Under the supervision of what state was it constructed? What problems in commerce did it solve?

How does the freight traffic of the Sault Sainte Marie Canal compare with that of the Suez? How does it compare in length with that of the Erie?

What nation is said to be the originator of the present canal system of Europe?

What was primarily the purpose of the Chicago Drainage Canal? How is it regarded in the engineering world? How many years in construction? What other purpose does it serve than that of drainage?

Canals for irrigation originated in what country?

Irrigation in America was first practiced by what race?

How many acres of land have been reclaimed by irrigation in Egypt?

What is the United States Government doing along this line? What and how much territory will be reclaimed by the projects now under way? What is the value of same?

To what extent will the taxable property of the United States be increased?

I would urge upon every young man to obtain, by severest economy if necessary, a restricted, serviceable and steadily however slowly increasing series of books for use through life, making his little library, of all the furniture in his room, the most studied and decorative piece.

—John Ruskin.

A common book will often give you much amusement, but it is only a noble book which will give you much profit. —*John Ruskin.*

Zoology

- I. DEFINITION.
- II. SUB-SCIENCES.
 - 1. Systematic zoölogy.
 - 2. Distributional zoölogy.
 - 3. Animal morphology.
 - 4. Animal physiology.
 - 5. Ecologic zoölogy.
 - 6. Evolutionary zoölogy.
- III. GENERAL CONSTRUCTION OF ANIMALS.
- IV. CLASSIFICATION.
 - 1. Protozoa—One-celled animals.
 - a. No definite shape; all forms; jelly-like substance; root-like projections of body for feet with which they seize their prey, and absorb it.
 - 2. Coelenterata—Many-celled.
 - a. Simple organisms; capture food by long tentacles grouped around the mouth; no distinct circulatory system or body cavity; two types—free swimmers, shaped like a bell, and those cylindrical in form, fixed to some support.
 - b. Examples: Sponge, anemone, coral, hydra, etc.
 - 3. Echinodermata.
 - a. Sometimes called radiates. Consists of five parts around a center. Covering sometimes a hard shell; others, soft and leathery. Alimentary canal separate from body cavity.
 - b. Three thousand living species found in all seas, such as starfish, sea urchin, crinoidea, etc.
 - 4. Vermes—Worms.
 - a. Made up of joints or segments, head, tail, upper and lower surfaces, heart, nerves, etc.
 - b. Many species, but all have same characteristics.
 - 5. Mollusca.
 - a. Sometimes called shellfish. Possess alimentary canal, distinct nervous system, digestive apparatus, mouth, gullet, stomach, intestines; shell developed later in some.
 - b. Examples: Oyster, clam, cuttlefish, etc.
 - 6. Arthropoda.
 - a. Sometimes called articulates. Possess well organized nervous systems; usually have simple or compound eyes; some species are parasites.
 - b. Examples: Insects, spiders, lobster, crab, etc.

7. Vertebrates.

a. Possess backbone; two cavities, upper containing brain, lower heart, digestive organs, etc.

b. Examples: Mammals, reptiles, fishes, birds, amphibians, etc.

CORRELATED SUBJECTS:

Genus	Nautilus	Snail	Sea urchin
Species	Birds	Amphibians	Foraminifera
Variety	Animals	Crinoida	Jellyfish
Fishes	Reptiles	Amoeba	Polyp
Crustacea	Mammalia	Vorticella	Oyster
Clam	Arachnida	Myriapoda	Mollusca

QUESTIONS.

NOTE.—For additional questions on animal life refer to NATURE STUDY. In that department will also be found interesting outlines on ANIMALS, BIRDS, FISH, INSECTS, etc.

What is zoölogy?

What is the derivation of the term zoölogy?

What does cold-blooded signify when applied to animals?

What are the difficulties of classification in the case of the lowest form of animal life?

What are the causes of the migratory habit of animals?

Which is the more abundant, the higher or lower forms of life? Why?

What animal is born without a covering? Why?

What are the most useful animals to man for domestic purposes?

What animals supply food and clothing to man?

What animals are known as ruminants?

What parts of the deer are of commercial value? Where are they found?

How are flesh-eating animals equipped to eat their food? To obtain it?

They are satisfied with one meal at a time, eaten rapidly; why?

Why does live stock have to graze so continuously?

What is the difference between an animal and a plant?

Name some of the many ways in which nature has provided for the safety and preservation of wild animals?

What animals produce the most expensive furs?

What do you mean by vertebrates?

In general, what one part of wild animals is of commercial value?

Name the domestic animals in what you think the order of their usefulness.

It is not the reading of many books which is necessary to make a man wise and good, but the well-reading of a few, could he be sure to have the best.

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